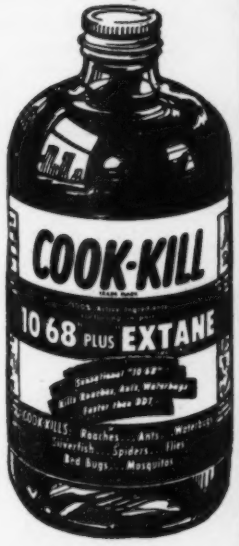
Pests
AND THEIR CONTROL
1942
AUGUST
VOL. 10, NO. 8
ORGAN OF THE PEST CONTROL INDUSTRY
Exterminators
Fumigators
Termite Control Operators
Entomologists
Inspectors and Supply Men


# COOK-KILL

MADE MARK

*"10 68" - Successor to DDT*
*"EXTANE" - Exclusive activator*

**Yes, now you can use and also offer your customers COOK-KILL, Cook's sensational new all-purpose household bug spray. In addition to "10 68" (Chlordane) COOK-KILL gives you the exclusive "plus" value of Extane. Extane is a combination of quick killer and activating agent. It gives you a faster kill and also activates the "10 68". Get COOK-KILL on hand.**




| Size | Cost to you in cases | Suggested retail per unit |
|---|---|---|
| Pints (12 in case) | $ 5.60 | $ .69 per pint |
| Quarts (12 in case) | 9.60 | 1.19 per qt. |
| Gallons (4 in case) | 8.10 | 2.95 per gal. |
| 5 Gallons (can) | 9.00 | 2.60 per gal. |
| 50 Gallons (drum) | 87.50 | 2.40 per gal. |

**You can blend your own COOK-KILL with COOK-KILL "40" Concentrate to be mixed 19:1 with odorless petroleum solvent for better pest-control work.**

| | |
|---|---|
| COOK-KILL "40" Concentrate in gallon cans (4 to case) | $15.50 per gal. |
| COOK-KILL "40" Concentrate in 5-gallon cans | $15.00 per gal. |
| COOK-KILL "40" Concentrate in 50-gallon cans | $14.50 per gal. |

**20% (Chlordane) "10 68" Concentrate**

*This is 20% by weight. To be diluted 9:1 with deodorized petroleum solvent.*

| | |
|---|---|
| Gallon cans (4 to case) | $5.50 gal. |
| 5 gallon cans | 5.00 gal. |
| 50 gallon drum | 4.50 gal. |

**50-E (Chlordane) "10 68" Emulsion Concentrate**

*To mix with water. For industrial and vegetation use. Kills roaches, waterbugs, grasshoppers, mites, chiggers, red bugs, and certain other insects.*

| | |
|---|---|
| 1-gal. cans (4 in case) | $11.50 |
| 5-gal. can | 11.25 |
| 50-gal. drum | 10.95 |

| | |
|---|---|
| 50% (Chlordane) "10 68" Wettable Powder, 100-lb. drums | $1.32 per lb. |
| 5% (Chlordane) "10 68" Dust, 100-lb. drums | .19 per lb. |

*Mail Orders Direct to*

**COOK CHEMICAL COMPANY**
**2020 Wyandotte**
**KANSAS CITY 8, MISSOURI**

Larvacide
CHLORPICRIN
THE SAFER FUMIGANT
for
INSECT and RODENT CONTROL
and SOIL FUMIGATION
SAFER BECAUSE OF INSEPARABLE TEAR GAS WARNING
WILL NOT BURN OR EXPLODE • PENETRATING
EASY TO APPLY
WARNING POISON
DO NOT BREATHE FUMES
THIS CAN HOLDS GLASS DISPENSER BOTTLE CONTAINING LIQUID LARVACIDE. IN OPEN AIR REMOVE TOP OF CAN WITH ORDINAL OPENER. TAKE EVERY PRECAUTION AGAINST BOTTLE BREAKAGE.
CONTENTS ONE POUND
ACTIVE INGREDIENT: CHLORPICRIN OVER 99%
INERT INGREDIENTS: LESS THAN 1%
INNIS, SPEIDEN & COMPANY
INCORPORATED
117 LIBERTY STREET, NEW YORK
INDUSTRIAL FUMIGANT
Kills flour moths, grain beetle, tobacco beetle, etc.
EASY TO USE
No fire or explosion hazard. No damage to drapes or rugs.
KILLS MOTHS
Ideal for home fumigation. Gets moths everywhere.
KILLS LARVAE and EGGLIFE, TOO
Adult insects are not the only victims of LARVACIDE.

In home fumigation, it's the PCO who gets the bulk of the moth work. It's the wise PCO who sticks to LARVACIDE — the powerful tear gas fumigant that penetrates deep upholstery and woolen blankets. Larvacide kills moths wherever they may be.

Larvacide is convenient to use—has no fire or explosion hazard—and will not damage upholstery, drapes or rugs. Its unmistakeable tear gas warning is your assurance that no one will be around when they shouldn't.

For INDUSTRIAL FUMIGATION, PCO's say there's nothing like Larvacide. The unusual killing power of this chlorpicrin fumigant makes it ideal for control of flour moth, grain beetle, tobacco beetle, drug store beetle. Larvacide finds insects in cracks, crevices, inside seeds. Adult insects are not the only Larvacide victims. This powerful fumigant kills larvae and egglife, too.

LARVACIDE, the tear gas fumigant, kills rodents without carcass nuisance, driving them out of retreats so they die on the open floor where they can be swept up.

## INNIS SPEIDEN & CO., 117 Liberty Street, New York 6, N. Y.

BOSTON • CLEVELAND • CHICAGO • OMAHA • CINCINNATI • PHILADELPHIA

# Larvacide

THE TIME TRIED TEAR GAS FUMIGANT

INNIS, SPEIDEN & CO.
117 Liberty St. N. Y. 6, N. Y. P-6

Send us information on Moth-Control
.....Mul-T-Vapor Bomb
Ship us.....lbs.
LARVACIDE
.....C. O. D.
.....Charge Our Account
Company .....
Address .....
City .....
Attention of .....

# New Business Opportunities for PCO's

Extensive tests, employing Du Pont ANTU, are opening up new fields for pest control operators:

**NOW**—PCO's may service edible products departments of meat packing plants with ANTU . . . as specified in Meat Inspection Division Memo No. 52, Supplement 2, of Bureau of Animal Industry, U.S. Department of Agriculture, dated March 17, 1947. (Copies available from Du Pont on request.)

**ALSO**—PCO's may now service candy and confectionery manufacturing establishments with ANTU . . . as outlined in National Confectioners' Association Bulletin No. 8, dated May 2, 1947.

### Professional Service Needed

Demand for your professional services will increase because of these new servicing opportunities. In addition, the opportunities for your services are almost unlimited, especially among hotels, restaurants, office buildings, apartment dwellings, warehouses.

Officials point out that the rat population is now at its highest level, with estimates on the total number running as high as *five hundred million.*

### Many PCO's use Du Pont ANTU

As you know, Du Pont pioneered the production of ANTU. And right from the start, Du Pont policy has been one of working closely with the professional pest control industry. PCO's who use Du Pont ANTU are assured of these plus values:

1. **ANTU that's chemically** and biologically tested.
2. **The benefit** of Du Pont's continuing research and development.
3. **Du Pont's continuing efforts** to open up new servicing fields for the pest control industry.

Du Pont ANTU is ready for immediate shipment. For full information, write the Du Pont Company, Grasselli Chemicals Dept., Wilmington 98, Delaware.

**NOTE:** *While ANTU is not as dangerous to other animals as most rat poisons, it is a poison and should be handled as such.*

**ANTU** *for better rat control*

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

DU PONT

REG. U.S. PAT. OFF.

# MERCK IS SERVING THE INSECTICIDE INDUSTRY AS A BASIC SOURCE OF SUPPLY FOR DDT

*An aerial view of the Main Plant of Merck & Co., Inc. at Rahway, N. J.*

As expanding facilities and raw materials come into operation, and current commitments are provided for, we will find increasing opportunities to cooperate with manufacturers of DDT insecticides.

***The product we offer is—***

**DDT**

TECHNICAL

(dichloro-diphenyl-trichloroethane)

***Setting Point 89° C. Minimum***
***For Manufacturing Purposes Only***

Please address your inquiry to the Insecticide Products Department, Merck & Co., Inc., Rahway, N. J.

**DDT** TECHNICAL

**For the Manufacture of Agricultural, Livestock, Horticultural, and Household Insecticides**

MERCK & CO., Inc. RAHWAY, N. J.

*Manufacturing Chemists*

New York, N. Y. • Philadelphia, Pa. • St. Louis, Mo. • Chicago, Ill. • Elkton, Va.
Los Angeles, Calif. • *In Canada:* MERCK & CO., Ltd. Montreal • Toronto • Valleyfield

MERCK MERCK

# Pests

**and Their CONTROL**

*Exterminators, Fumigators, Termite Control Operators, Entomologists, Insecticide and Supply Manufacturers*

COOPERATING WITH NATIONAL PEST CONTROL ASSOCIATION

AL COSSETTA, *Editor*

MAX ROSENTHAL, *National Advertising Representative*
120 Liberty St., New York City 6, N. Y. Ph. Be. 3-5919

PUBLICATION OFFICE, 1200 OAK ST., KANSAS CITY 6, MO., PHONE VICTOR 6332

VOL. 15, NO. 8 | AUGUST, 1947 | ESTABLISHED 1933



## NATIONAL PEST CONTROL ASSOCIATION, INC.

### OFFICERS AND DIRECTORS

**October 1946—October 1947**

**PRESIDENT**

J. Harvey Sturgeon, 612 E. Broadway.....Louisville 2, Ky.

**REGIONAL VICE PRESIDENTS**

H. O. Abel, 4320 Ross Ave.....Dallas, Texas
J. Edwin Sameth, 1060 Broad St.....Newark 2, N. J.
V. H. Montgomery, 1161 Post St.....San Francisco, Calif.
Harold E. Jennings, 37 S. Wabash Ave.....Chicago 3, Ill.
Glenn H. Burnett, 92 Plaza Way, S. W.....Atlanta 3, Ga.

**SECRETARY**

William O. Buettner, 3019 Ft. Hamilton Parkway.....Brooklyn 18, N. Y.

**TREASURER**

Robert C. Yeager, 100 East Court Street.....Cincinnati 2, Ohio

**DIRECTORS**

**Three Years—1946-1949**

I. B. Carncross, 802 E. Fayette St.....Syracuse, N. Y.
Charles C. Delk, Box 1093.....Fresno 14, Calif.
Charles Denny, 19 W. Big Bend Road.....Webster Groves 19, Mo.
Louis Gatto, P. O. Box 65.....Beaver Falls, Pa.
Jaques J. Hess, 9 West 29th St.....New York City
Charles Parlow, 1200 Morton St.....Lafayette, Ind.
Mark Weintraub, 272 Devonshire St.....Boston 10, Mass.

**DIRECTORS**

**Two Years—1946-1948**

Jerome L. Howell, 2403 S. Main.....Houston, Texas
Albert M. Akers, 2122 E. 2nd.....Cleveland, Ohio
Morton S. Prescott, 129 S. Laflin St.....Chicago 7, Ill.
Martin T. Meyer, 213 S. 10th St.....Philadelphia 7, Pa.
D. C. Tracy.....Los Angeles, Calif.
George Hemmert, 436 E. Woodbridge St.....Detroit, Mich.
Herbert Meyer, 165-33 Hillside Ave.....Jamaica, N. Y.

**DIRECTORS**

**One Year—1946-1947**

Sidney Wimmer, 143 West 53rd Street.....New York, N. Y.
Henry Turrie, 512 W. North Avenue.....Milwaukee, Wisc.
Joseph W. Hahne, 3837 South 23rd Street.....Omaha 7, Nebr.
John Medoff, 445 63rd St.....West New York, N. J.
Mrs. Lavonne Rukin, 5955 W. 65th St.....Chicago, Ill.
A. S. Krawcheck, 101 South 20th Street.....Birmingham, Ala.
J. Wilfred Gunn, 2903 Beverly Boulevard.....Los Angeles, Calif.

**CANADA**

P. Henry Maheu, 3128 Masson Street.....Montreal, P. Q., Can.

**PAST PRESIDENTS**

William O. Buettner, 3019 Ft Hamilton Parkway.....Brooklyn 18, N. Y.
Thomas C. Raley, 1135 Pine Street.....St. Louis 1, Mo.
C. Norman Dold, 6 East Lake Street.....Chicago 1, Ill.
Bartlett W. Eldredge, 118 Calvary Street.....Waltham 54, Mass.
H. K. Steckel, 113 West Rich Street.....Columbus 15, Ohio
*H. G. Irving Sameth
*Walter S. McCloud
*L. R. Alderman
P. Calvert Cissel, 928 Eye St., N. W.....Washington 1, D. C.
F. E. Bohman, 173 Church Street.....Hartford 3, Conn.
George R. Elliott, 58 Front St.....Worcester 8, Mass.
Theodore Oser, 315 Peachtree St.....Atlanta, Ga.

*Deceased.

**STATEMENT**

The National Association appreciates the co-operation given by way of publicity. The Association is not responsible for articles published unless credited to the Association. The list of officers and directors is published for informational purposes only.

For further details, communicate with
**WILLIAM O. BUETTNER, Secretary**
**3019 Fort Hamilton Parkway Brooklyn, New York**


## CONTENTS

*"Contributed articles in this publication do not necessarily reflect the opinions of the editors. The editors invite discussions, comments and all types of literary material pertaining to pest control and pests from any person interested in the advancement of the field."*


**Editorials** ..... 6-7

**The Common Dermestid Beetles** ..... 8
**By H. E. Gray**

**The Techniques of Application and the Control of Roaches and Bedbugs With DDT** ..... 16
**By Robert L. Stenburg**

**The Permanence of Termite Repellents** ..... 26
**By George N. Wolcott**

**Panama Test House Immune to Termite Attack After 21 years** ..... 32

**Report Tells of Advances Made in Insect Control Methods** ..... 36

**The Federal Insecticide, Fungicide and Rodenticide Act** ..... 40

**Local Organization News** ..... 44

**Whats New in Pest Control—Personals** ..... 46

**Write For These Booklets** ..... 50



Published monthly by PESTS, 1200 Oak Street, Kansas City, Missouri. Subscription $4.00 per year, 2 years $6.00, 3 years $8.50. Publishers not responsible for unsolicited manuscripts. No manuscripts will be returned. All advertising copy and contributions must be in our hands by the 15th of the preceding month of the issue in which they are to appear. Three weeks' advance notice necessary for change of address. Both old and new address must be given. Entered as second-class matter November 15, 1945, at the post office in Kansas City, Mo., under the Act of March 3, 1879.

# EDITORIAL

## NPCA Convention Program Now In Process

THE FIFTEENTH annual convention of the National Pest Control Association, program for which is now in process, will emphasize problems and newer formulations. The convention will be held at the Hotel Bellevue Stratford, Philadelphia, Pa., October 27, 28, and 29; and an excellent array of speakers providing worth-while information to PCO's is promised.

The following convention committees have been appointed:

NATIONAL CONVENTION COMMITTEE—E. R. Jennings, Chairman, 500 Fifth Avenue, New York 18, N. Y.; J. Wilfred Gunn, H. L. Belle, Harlem B. Ives, Lester A. Bureau, Jack Rudick, Joseph De Fiore, Herman L. Felton, William O. Buettner

PHILADELPHIA COMMITTEE—Martin T. Meyer, Chairman, 213 South 10th Street, Philadelphia 7, Pa., Russell H. Bauer, Secretary

PHILADELPHIA SUB-COMMITTEE CHAIRMEN—**Advertising**, Charles D. Cushing; **Booth Exhibits**, York A King, Jr.; **Entertainment**, Byron Kaufmann, **Publicity**, W. C. Sharp; **Reception**, Walter R. McWilliams; **Registration**, A. E. Ritt; **Sergeant-at-Arms**, A. E. Tomassetti; **Ladies Activities**, Mrs. Martin T. Meyer

Confronted by many perplexing problems, as he is, the PCO, whether a member of the NPCA or no, can do much to make the program one of vital and helpful interest by submitting topics for discussion at the earliest possible moment.

## Forsees Bright Future For Insect Control

A timely, provocative analysis of the future of insect control, especially the role of the industry in it, was presented by S. A. Rohwer, assistant chief of the Bureau of Entomology and Plant Quarantine, before the thirty-third mid-year meeting of the NAIDM at Chicago recently. In essence, Mr. Rohwer, forsees a bright future for insect control—a future which, provided the industry readies itself for the responsibilities involved, will offer not only unlimited opportunity for public service but adequate reward as well.

Cognizant that the "present situation may be perplexing because of the many new developments," Mr. Rohwer expressed the faith "that these will be used for the good of all. If they are not, much of the benefits of the recent research will be lost or its use delayed," he warned.

"It is to be expected" he added "that new materials will impinge upon, and in certain places, replace those which have been used before. To say that those now in sight will so change the field of insect control that need for insecticides will vanish has no sound foundation. In fact all current developments give assurance of greater use of household insecticides in the years to come.

"Standard, proven insecticides and particularly some of the plant materials, such as pyrethrum, are far from being on the way out. We may use them differently, and we can all agree that the use of small quantities in large amounts of oil will largely be a matter of history. It is, however, reasonable to assume that old well-known materials will have an important place in pest control."

Mr. Rohwer further declared there are some things in the immediate future that are a matter of concern. For instance, he noted, "intensive investigations that have been carried on with DDT, have stimulated thinking in this general class of compounds."

None of this need be put aside, he advised, "but in exploring this and other fields care must be used not to rely too implicity on what we know about DDT. So much is known about DDT that there is a tendency to use it as a basis for comparison. Toxic effects of new materials are being commonly rated with those of DDT." Continuing, he declared, "We need to recognize that this basis is none too fixed or secure. Added to this tendency to make combinations and to use some of various materials of approximately the same level of toxicity to man does not mean the mixture will be the same. Synergium and the effect of combinations of toxicants are accepted in insect control. We cannot justly assume other form of animal life will not follow the same pattern.

"To me all this adds up to the belief that the future of this field of household insecticides lies in the hands of those who do the research, development, educational and sales work. If we all pursue a sound policy, recognizing only facts, credit and profits will be the reward for what is done for humanity. All that leaves plenty of room for honest initiative and competition, factors which have had important influence on our accomplishments and which are essential to democracy."

## Itinerant PCO's

One of the most unfortunate and exasperating experiences that John Q. Public has to meet is to deal with an unscrupulous itinerant self-styled, PCO. With a smooth tongue and a credible line of talk, this person will call on an individual to solicit a job servicing the premises against termites for example, making broad guarantees of satisfaction.

"John Q" naturally believes the promises, but after investing a goodly sum of money, often discovers he has been fleeced. The intinerant PCO, here today and gone tomorrow, is nowhere to be found, and the victim feels resentful against all PCO's, failing to discern between the honest and the dishonest. Such experience brings discredit unjustly upon the entire industry.

The responsible, well established PCO firm takes every possible means of preventing such an unfortunate experience. We believe one of the most effective means of educating the public to deal with reliable firms is cooperative advertising. In many places, local well established firms are joining in such advertising and finding it very effective.

One local association in a large city has the following ad listed in the classified section of the telephone directory:

> "Patronize your local pest control operator; member of — Association; National Pest Control Association. For reliable service, call, etc."

We commend this practice and suggest study be given to other means of warning the public against the danger of board by fly-by-night individuals.

## What of the Future?

It is a foregone conclusion that when we are optimistic about the future, business usually prospers; but if the future is viewed with fear, then things often begin to drop and business collapses.

A backward glance may very often be helpful in times like these; when so many changes are taking place. It is both salutary and stimulating to see the kind of service that is being rendered nowadays as compared with a few years ago.

With new fields opening before PCO's, the outlook is most encouraging. There is a bright future ahead for PCO's who will do an effective job in rendering service to the public.

Constructive action is the key to success and the sooner PCO's realize that they have an essential service for the public, the sooner will they establish confidence in their business. The PCO's outlook for the future is bright.

## Charles F. Opitz

The untimely passing of Charles F. Opitz, president of John Opitz, Inc., Long Island City, reported in the issue just previous, came as a shock to his host of friends in the industry. Only 54, he suffered a heart attack at his home in Long Island the evening of June 12 and died in a matter of moments.

Reasonable, thoughtful and gentle almost to the point of shyness, he was a familiar figure at the various NPCA conventions, where he exercised to the full his adept hobby of taking photos of interesting and colorful events, many of which have appeared in these columns. Back in 1938, he co-sponsored the "exterminator" name contest, donating the prize money involved, and out of which stemmed the now familiar "PCO".

He was a member of the Elks, Lions Club, NPCA and NAIDM. Interment was at Hurley Cemetery, Hurley, N. Y.

Surviving are his wife, Mrs. Marion Opitz, a son Charles L; and two brothers, Henry R. and John, to whom we extend our heartfelt sympathy. The industry will sorely miss Charlie Opitz. We will need men like him in the years ahead of us.

## Commends PCO's for Cooperation

To the Editor:

I have read with interest the editorial in your June issue concerning the rodent control program in Kansas City.

We are glad to have your readers know of our experience in getting our program underway. The splendid cooperation of the pest control operators has contributed greatly to the early success of the program and we have confidence that this same relationship will continue.

Yours very truly,
W. J. Dixon, Commissioner,
Health Department, Kansas City, Mo.

---

To PESTS Magazine

We wish to acknowledge and congratulate you on your article entitled "DDT Insecticides in Public Health Program" on Page 30 in the June 1947 issue of **"Pests."**

As exporters of chemical products we have engaged in an extensive program of educating our foreign distributors on the uses of DDT products for public health.

We would greatly appreciate the opportunity of purchasing from you two hundred copies of this article, reprinted on your letterhead to use in conjunction with the above-mentioned program.

Michigan Chemical Corporation
M. D. Reichard
Export Sales Division

## Philadelphia, NPCA's Convention City

Modern as the future, yet deeply rooted in the historical past; bright and stimulating, yet gracious and quietly charming,—this is Philadelphia, a city of fascinating contrasts.

Within a few blocks of its very heart, where modern skyscrapers reach to the clouds amid the finest shops, theaters, restaurants and night clubs, watched over by City Hall's statue of Philadelphia's founder, William Penn, stands a quiet scattering of two and three-story brick buildings which constitute, in truth, the "Heart of the Nation," your nation, the United States of America.

Here, in all the graceful simplicity of American Colonial architecture, rise the white spire and red brick walls of Independence Hall, birthplace of the Declaration of Independence and the Constitution of the United States. Within its hallowed confines stands the Liberty Bell, worldwide symbol of freedom through the years. Here is Carpenter's Hall, where the spokesmen for the embattled colonies first gathered. Here, in a quaint little home, preserved as a national shrine, Betsey Ross sewed together the first Stars and Stripes. Here are the churches and meeting houses built by the early settlers, where the founding fathers worshipped freely according to their creeds. All these, and many more historical shrines dear to all freedom-loving peoples are within a fifteen minute walk of mid-town Philadelphia.

Also within easy visiting distance of City Hall are Philadelphia's industries which have earned for Penn's "greene countrie towne" the title of "the World's Greatest Workshop." The Philadelphia area manufactures everything from needles, pins, and cigars to complete railway trains, and builds the ships to carry its products from the great freshwater harbor to all the major ports of the world.

Northwest of the center city, along Beautiful Benjamin Franklin Parkway spreads a wealth of interesting places, testimony of Philadelphia's love of science and the arts. Within a mile or so are the Benjamin Franklin Memorial and Franklin Institute Museum, housing one of the finest planetariums in the world, together with a vast collection of scientific exhibits including a full size working model of a locomotive, the Rodin Museum of Sculpture, the Acadamy of Natural Science, the Aquarium and one of the nation's largest and most magnificant Art Museums.

Beyond, stretching for 11½ miles along the banks of the Schuylkill River and Wissahickon Creek is Philadelphia's beautiful Fairmount Park, over 3,000 acres of rolling green plains and wooded hills. Within the Park are Horticultural Hall, the Zoological Gardens, and Robin Hood Dell, where members of the world-famous Philadelphia Orchestra play to summer audiences under the stars.

With all this,—its historical significance, industrial and cultural importance, its scenic beauty and bountiful provision for rest and recreation, Philadelphia preserves the tradition of gracious hospitality which made it host to the nation's founders. Today, its fine hotels know how to make a single guest or a thousand people feel individually at home. Nowhere else in the world can there be found the hospitality which Philadelphia offers its newcomers and its visitors.

# The Common Dermestid Beetles

By DR. H. E. GRAY, In Charge, Stored Product Insect Investigations,
Division of Entomology, Science Service, Department of Agriculture,
Ottawa, Ontario, Canada.

THE family Dermestidae contains about fifty species which have been reported as infesting stored products. The total loss throughout the world runs into many millions of dollars annually.

Dermestids attack a wide variety of materials of both animal and vegetable matter. Most of the damage is caused by the larvae as the adults of many genera require neither food nor water and others feed on pollen or nectar of flowers.

Most of the Dermestids require animal food or material containing proteins. This is probably a primitive food habit and the ability to grow on vegetable material is a more recent development. Only one species, the Khapra beetle, **Trogoderma granarium** Everts, seems to be restricted to the feeding on grain and cereal products. The insect will feed experimentally on material of animal origin.

Dermestids may at times act as intermediate hosts of parasites or be concerned as vectors of disease organisms. When feeding on carcasses and skins of animals which have died of anthrax, they may transmit the disease in a mechanical manner. When workers handle badly infested commodities they may suffer intense itching of the skin, conjunctivitis and irritation of the respiratory passage because of the larval hairs particularly in the case of Dermestes.

A few museum workers have used Dermestids to clean the skeletons of the smaller animals. The insects do a very superior job without damaging the skeletons and the work is much more rapidly done than by any other method.

There are several natural out-of-doors reservoirs of Dermestids in which these pests can live and thrive. The most important are the nests of bees and wasps, certain gregarious caterpillars, spiders, birds and rodents. All of these contain suitable food in the forms of dead insects, feathers, dead birds and animals. From these various small and widely scattered locations the Dermestids are continually migrating to the home and warehouse where they infest stored products.

While there are six subfamilies in the family Dermestidae, practically all of the common pests of the group are in three of them and distributed as follows:

| Subfamily | Genus |
|---|---|
| Dermestinae | Dermestes |
| Attageninae | Attagenus |
| Anthreninae | Anthrenus |
| | Trogoderma |

The members of the genus **Dermestes** attack materials of animal nature. The larder or bacon beetle, **Dermestes lardarius** L., as its name suggests, is very frequently a household pest in many parts of the world. It has been recorded from stored provisions, ham, bacon, meats, cheese, especially if the latter is old or spoiled, museum specimens such as the stuffed heads of animals, skins of birds, feathers, dried fish, and stored tobacco. Its larvae are not infrequently found in large numbers in timbers in buildings which have stored products it attacks. Reports from Germany indicate that this species has been found in poultry houses attacking newly hatched chickens and ducklings. It is not uncommon in dog biscuits and the infestation probably originated in the animal material which is incorporated in the product.

In brief, the life history is as follows. The adults become active in late spring and often enter houses in search of their preferred food. The eggs are laid in batches in cracks and crevices. Records show that individual females lay from 100 to 200 eggs and in somes cases, probably more than this number. The larvae, for the most part, feed on the outer surface of materials such as ham, seeming to prefer the fatty portion. There are a varying number of moults and when the larval stage is complete, the larvae usually burrow deeply into the food or they may leave the food entirely and tunnel into wood or cork in order to pupate. It is usually considered that there are two or more generations per year in North America. The whole life history may be completed in from 50 to 60 days.

The hide or leather beetle, **Dermestes maculatus** Degeer,is the most important pest in this genus. This insect is cosmopolitan in distribution and is often carried by ships from port to port. It has been recorded from mummies, old bones, skins, hides, leather goods, salted and dried fish as well as hams, sole leather, and tobacco. It is often found in bone factories, warehouses where skins are held, as well as in dog biscuit factories. At times it causes extensive damage to bacon and also to hair brushes. The larva is large in size and has a voracious appetite. They often cause extensive damage to timber and wood-work generally.

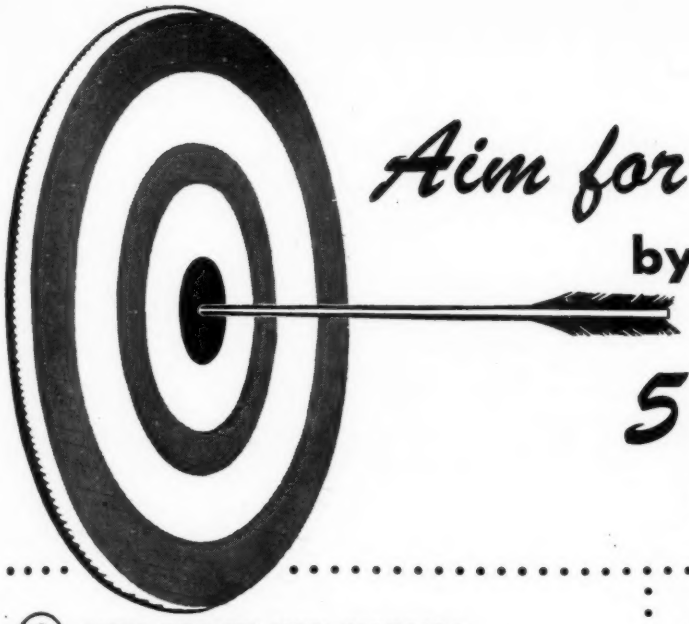
These insects are not infrequently found in packing houses and at times render the abbatoirs a real service by removing the flesh from the bones which are to be ground in the bone room. If this material can be maintained in a steel hopper and the building is insect-proof and has steel or cement supports rather than ones of wood, their activities can be pretty well controlled. However, where wooden structures are used, the insects can and do riddle even large timbers reducing them to a mere shell in seeking sites in which to pupate.

The life history of **Dermestes maculatus** Degeer is similar to that of **D. lardarius** L. The females on the average lay about 500 eggs. There is considerable variation in the number of larval stages. From egg to adult may require as little as 42 to 46 days or it may extend to several years according to the temperature and the food available.

**Dermestes ater** Degeer. This insect is not particularly common in North America but is often found in goods from Europe and Asia. **D. ater** is mainly a pest of dried fish. It has also been recorded from copra, oil cakes, rotten nuts, silk worm cocoons, dead birds, etc. This species can go through its life history in a somewhat shorter time than **lardarius.**

In addition to the three species mentioned, there are a number of other members of the genus **Dermestes** which are of more or less local importance. Several of these cause considerable damage to silk in the raw state in areas where sericulture is carried on.

The genus **Attagenus** contains two of the common carpet beetles. The black carpet beetle, **Attagenus piceus** Oliv., is by far the more common in North America and is wide in distribution. The larva cause much damage to carpets and woolen articles,



# *Aim for Greater Profits*

## by using Quality Materials

### *5 superior products to help you do a thorough pest control job*

**(1) AERO BRAND* HCN DISCOIDS . . .**

The most generally-used fumigant in the Pest Control industry. More dwellings, industrial buildings, railroad cars, ships and stored commodities are fumigated with hydrocyanic acid gas than with any other fumigant. Commercially pure hydrocyanic acid gas absorbed in thin cellulose discs. One-pound and forty-ounce containers readily accommodate dosage requirements. AERO BRAND HCN DISCOIDS are simply scattered from the can. No dirt or mess in application or clean-up.

Where insects and rodents are a problem in enclosed spaces AERO BRAND HCN DISCOIDS provide the answer.

**(2) ACCOTOX* 50% DDT WETTABLE POWDER**

A superior micron-sized DDT formulation having many advantages. Sprays of effective strengths are made economically. Instant dispersion and prolonged suspension in water mean ready mixing and even coverage. ACCOTOX does not penetrate wood or masonry but leaves sprayed surfaces lightly coated with tiny, jagged crystals which insects cannot escape.

ACCOTOX kills flies, fleas, mosquitoes, gnats, water bugs, American and Oriental roaches and many other pests. A *must* in servicing homes, bakeries, dairies, restaurants and food-processing plants. Sprayed on walls, floors, ceilings, refuse containers and vegetation, ACCOTOX is essential to complete Pest Control Service.

**(3) CYANOGAS** A-DUST . . .**

The ideal outdoor fumigant for "cleaning out" rat harborages in city dumps, sanitary fills, under sidewalks, tight floors and pavements, and in fields, along ditch banks and levees. Applied effectively and economically with the handy CYANOGAS Foot Pump.

*Not a bait . . .* CYANOGAS A-DUST liberates hydrocyanic acid gas *in the burrow*. ALL rats, adult and young, breathe the gas and die immediately. No dangerous residues to be picked up by unwary children or pets.

**(4) ACRYLON** FUMIGANT . . .**

The liquid "spot" fumigant used for the destruction of insects by direct application to food-processing machinery. Indispensable for servicing flour mills, bakeries and similar food-processing plants. Not a general space fumigant.

ACRYLON also has been used successfully to fumigate clothes closets and other small enclosures in the home and elsewhere. (Observe usual fumigation precautions.)

**(5) CYANOGAS** G-FUMIGANT . . .**

A dustless sea-sand size granulation of Calcium Cyanide liberating hydrocyanic acid gas. The same positive fumigant but of lower strength than AERO BRAND HCN DISCOIDS. Unsurpassed for easy, economical fumigation of small storage buildings needing only low dosages of gas. (Not to be used in dwellings.)

*We shall be glad to send you full information concerning any or all of these insecticides and rodenticides.*

**Reg. U. S. Pat. Off. *Trade Mark

**AMERICAN CYANAMID COMPANY**

*Agricultural Chemicals Division*

*Insecticide Department*

32-F ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK

*Branch Offices:* 628 Dwight Building, Kansas City 6, Mo.
2203 First Avenue, South, Seattle 4, Wash. • Azusa, Calif.

etc., and in addition attacks silk, hair, feathers, furs, as well as stored grain, flour, and other cereal products and it has been recorded from tobacco and other materials.

In the home this insect is common in flour cracks, back of baseboards, under carpets, in cupboards, neglected trunks, and in the cold air ducts of furnaces. In mills and warehouses the larvae often live in cracks in the floor in accumulations of flour, meal, and lint. When flour milling machinery is idle, the silk cloths in reels and other machines are sometimes damaged by the larvae. The black carpet beetle is one of the insects most commonly found in flour storages, particularly in old wooden buildings.

The adults are most abundant in the spring and early summer in the home and in cereal warehouses but in the laboratory some adults are present in cultures throughout the year. The smaller adults are able to crawl through the 12 mesh screen commonly used on windows or may gain entry around poorly fitting frames. The adults may live for a month or more and the bulk of the eggs are laid within the first two weeks. In the homes the eggs are often placed under the surface of carpets and around the baseboards.

The eggs are oval in outline, pearly white in colour, and about 1/40 of an inch in length. The incubation period varies with the temperature, 9 to 12 days being required at 75°F. and 20 to 24 days at 65°F.

There is normally one generation per year. The larvae avoid the light and burrow into the material on which they are feeding, develop slowly, moulting a varying number of times. The larval period usually takes about eight to twelve months but under unfavourable conditions, a larva may require two years or more to complete its development. Both adults and larvae often simulate death when disturbed.

This insect causes a considerable amount of damage which is ascribed to wear and tear or defects of the material. It is much more tenacious of life than the clothes moth and its ability to survive on a wide variety of foods, aids in maintaining the infestation.

This species is often used in the testing of moth-proofing materials. Heal (1) reports good success in rearing this species on dog food ground so that it will pass through a 30-mesh screen. The cultures are sieved with a 24-mesh screen which separates the larvae, pupae, and cast skins from the food medium. The pupae are removed and the emerging adults are placed in pint jars for oviposition with woolen cloth which had previously been sprayed with an aqueous extract of brewers yeast. The adults are removed after a week of oviposition and three weeks later, the young larvae are transferred to the ground dog food.

Our own laboratory work with this species indicates that ground cereal products to which is added about 35 to 40 per cent of fish meal, crab meat meal, or meat meal, yield quite satisfactory results. The adult insects apparently require access to moisture when confined if they are to mature and lay the maximum number of eggs.

**Attagenus** pellio L., is often associated with **A. piceus** and with the exception of the white spots on the elytra, is very similar to the latter. The life history and feeding habits are also similar.

The genus **Anthrenus** contains several species of carpet beetles which are more or less similar in general appearance. Of these the common carpet beetle or buffalo carpet beetle, **Anthrenus scrophulariae** L., is the most important. This insect is of European origin where it is known chiefly as a museum pest. It is now widely established in North America.

The adults appear in spring and are often found out of doors on plants such as spiraea, wild cherry, cultivated Berberis, wild carrot, wild parsnip, etc.

The eggs are laid on carpets and other woolens usually in folds, and the odd shaped larva frequently causes considerable damage. They eat irregular holes in fabrics. When carpets are tacked in place, the damage is often in a slit-like pattern following the cracks. This insect also attacks feathers, fur, brushes, articles containing hair, silk goods, as well as museum specimens of all kinds. The most serious damage is sustained by carpets and the general use of rugs has resulted in a decrease in damage. The insects are quite resistent to starvation.

The rate of development depends very largely on temperature and the food supply. Under favorable conditions the developmental period requires about 100 days. It is usually considered that there are six larval instars although this number may be increased materially under unfavorable conditions.

The varied carpet beetle, **Anthrenus verbasci** L. This beetle is similar in shape to the common carpet beetle averaging slightly smaller in size. The beetles are often present in large numbers in late spring and may be seen on the flowers of spiraea, white roses, corn cockle, etc.

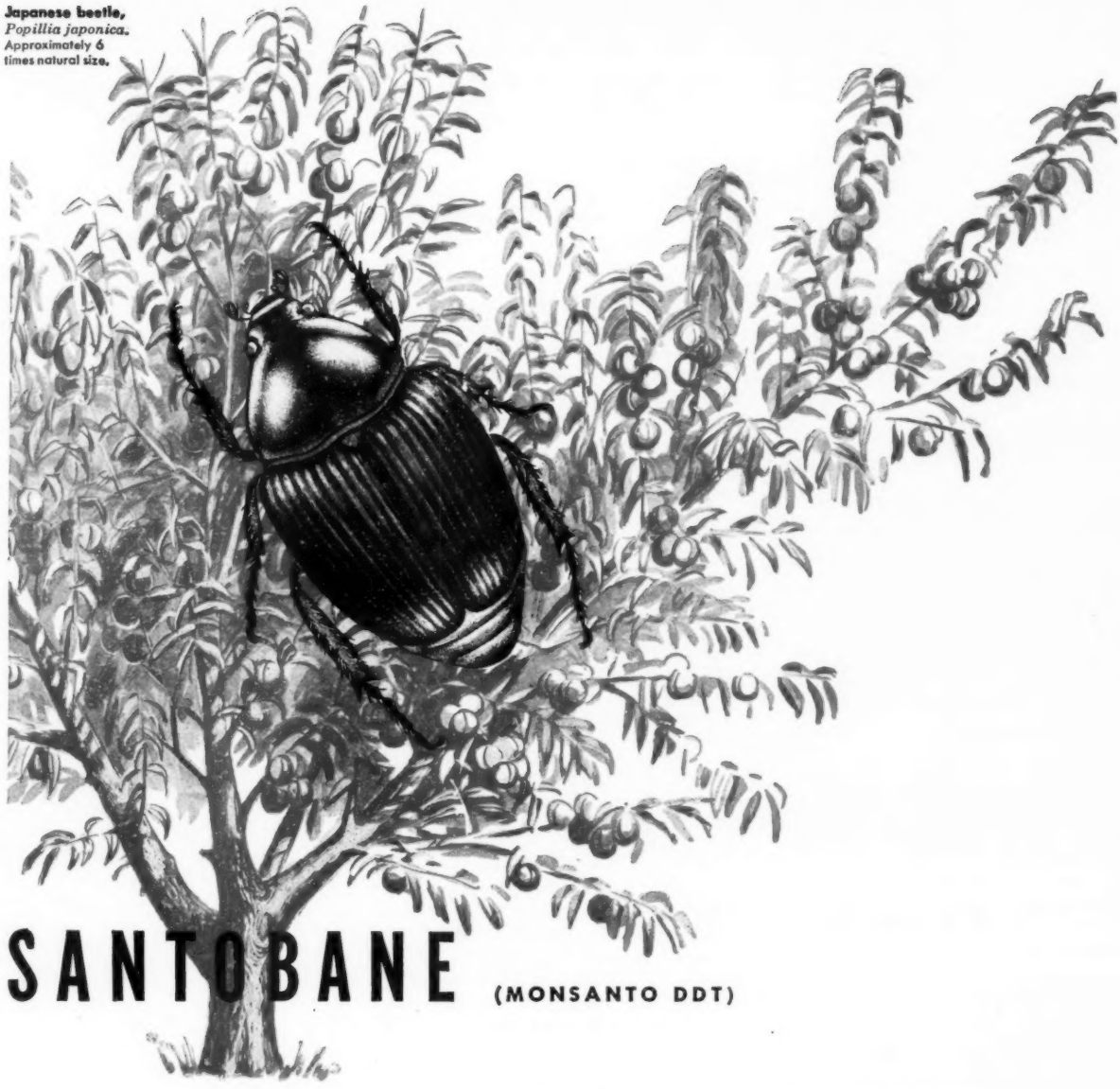
The larvae are important museum pests but also damage carpets, woolens, silks, feathers, fur, hair, as well as leather bindings. Horn and whalebones have also been attacked. In the vegetable products, middlings, flour, peanuts, corn, seeds, and red pepper have been used as food. There is normally only one generation per year and some specimens require much longer than this for development.

The furniture carpet beetle, **Anthrenus vorax** Waterhouse. This is an Asiastic species, and in recent years has become established in United States particularly along the Atlantic seaboard. This is the most destructive of all carpet beetle and fabric pests and is likely to be introduced into Canada by the shipment of household goods from areas of infestation in United States. There is only one generation a year, the most of which is spent in the feeding or larval stage. It causes considerable damage to hair filled furniture, brushes, and carpets as well as feeding on all kinds of animal substances. There are no records of this pest in Canada. In general appearance, it is very similar to the common carpet beetle and the varied carpet beetle.

The lesser museum beetle, **Anthrenus museorum** L. This beetle while widely distributed in North America, is not as abundant numerically as the other carpet beetles. The larvae have been recorded from grain, stored wool, woolen fabrics, hairs, feathers, fur, and silk. It causes considerable damage to museum specimens. Infestations sometimes occur in homes, in attics, on dead insects such as cluster flies. The insects are often abundant during the spring and early summer on flowering shrubs such as spiraea, etc.

The genus **Trogoderma** contains two species which are quite common in America—**Trogoderma versicolor** Creutz. and **Trogoderma ornata** Say. From a world point of view, the khapra beetle, **Trogoderma granarium** Everts, is the most important pest in the genus. It causes serious damage to stored wheat and barley as well as attacking a large number of other food materials in warmer parts of the world, such as India. It is not as yet established in North America.

The larger cabinet beetle, **Trogoderma versicolor** Creutz. This species



**Japanese beetle,**
*Popillia japonica.*
Approximately 6 times natural size.

# SANTOBANE (MONSANTO DDT)

Field tests have indicated that the Japanese beetle is another in the long list of insect pests that are successfully controlled with formulations containing Santobane — Monsanto's DDT. Manufacturers specify Santobane because of its uniform, free-flowing, granular characteristics. It can be readily solubilized, emulsified or milled.

Santobane is available to meet your requirements.

Your inquiries regarding the properties and uses of Santobane will receive prompt attention. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 S. Second St., St. Louis 4, Mo.

*Santobane: Reg. U. S. Pat. Off.*

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

is widely distributed throughout the world and is a serious pest of seeds. It has been reported from stored wheat, rice, and other grains and also from ground materials such as corn meal as well as animal products such as woolens, dried casein, milk powder, and dried insects. Infestation of the grain in the straw used to fill horsecollars resulted in extensive damage by the larvae boring through the leather.

Hinton (2) feels that many of the records ascribed to **ornata** really refer to **versicolor** and his interpretation has been followed in the following life history.

In heated buildings this species breeds throughout the year and all stages are present at the same time with a normal two to three generations per year. After mating, the females lay as many as 125 eggs in the food material. There is a great variation in the rapidity of development of the larvae; on ground cereal, at a température of 90°F., it may be as short as 1½ months or it may be prolonged to 5 or 6 months. The vitamin B content of the food has apparently an important bearing on the rate of development.

Wodsedalek (5) conducted some interesting experiments with this species and was able to have the larva increase to essentially mature size and then decrease to practically the size of a newly hatched larva at will by alternate periods of feasting and fasting. One larva lived 5 years without any food whatsoever.

**Trogoderma ornata** Say. This is a common museum pest being especially injurious to insect collections. It is often found outdoors in hollow trees and similar locations, where it lives on dead insects. The larvae thrive on dried insects and fish, although they have been reported from various animals substances such as feathers, furs, skins, wool, etc., as well as vegetable material including grain, nuts, seeds, bulbs, beans, and tobacco. The life history is quite similar to that of **Trogoderma versicolor** Creutz.

### Control

Minor matters often make very lasting impressions. When I think of the control of Dermestids, I sorrowfully recall a goodly number of fishing flies, streamers, bucktails, and feathered hooks which these pests destroyed for me when I was careless in storing them. Now I keep such things in tightly stoppered tubes. Like fishing, the problem of Dermestid control is rather complicated. It depends on the species you are trying to control, as well as where, how, when, and even on the weather!

Our control problems may be divided in several ways on the basis of measures applicable,

(1) in the home, and
(2) in factories, etc.,

and furtheremore on the basis of whether they are

(1) preventive, or
(2) curative.

Let us deal with the home problem first. Many of the suggestions which are made will apply equally to the clothes moth which is just as well, because in most homes both types of fabric pests are usually present.

**Prevention**—Good housekeeping is a term which we use a lot in connection with food plant sanitation and it means just what the words say. It implies care and industry in cleaning up all corners, digging the dirt out of the cracks and dusting in the unseen places as well as airing the "Sunday best" to protect it from vermin. If this principle is strictly adhered to at all times, little trouble is likely to be encountered.

The change from tacked-down carpets to loose rugs helped a lot to beat the common carpet beetle; the introduction and regular use of the vacuum cleaner has made futher advances in keeping the home free from Dermestids and clothes moths; the systematic elimination of breeding places by sealing floor cracks and openings around baseboards is another step in the right direction. Cleaning the cold air ducts of the furnace at least once per year will dispose of one hidden source of trouble.

What can be done to keep these fabric pests out of the home? Perhaps the best method is to install a **complete set of tightly fitting full-size screens** on all the doors of the home and on those windows which are opened. The screen used should be 16 mesh or finer. The popular 12 mesh screen is too coarse to exclude these pests. One bright July day, I watched several adult black carpet beetles emulate the man on the flying trapeze with their in-and-out gyrations. Poorly fitting screens permit entry around the frame and half screens rarely fit tightly enough to keep out the insects.

Here is a word of warning to flower lovers. It is much safer to admire many of our pretty wild flowering shrubs and trees out-of-doors. One of the easiest ways to introduce carpet beetles into the home is by means of bouquets of spirea, roses, wild cherry, wild plum, apple, pear, Deutzia, golden rod, sunflowers, asters, etc. Many of the white and creamy flowered varities seem to be particularly attractive to the adult beetles.

It is equally important to check over clothes which have been in summer cottages during the summer to be sure that fabric pests are not taken into the home by this means.

Clothes and other woolens within the home should be examined frequently. Sports clothes require special attention. They often become perspiration-soaked and because they are not in daily use, they may be neglected. It is never wise to hang soiled clothes in a cupboard for any length of time because of the danger of insect attack. They should be sent to the cleaners promptly as cleaned clothes are much less likely to be damaged.

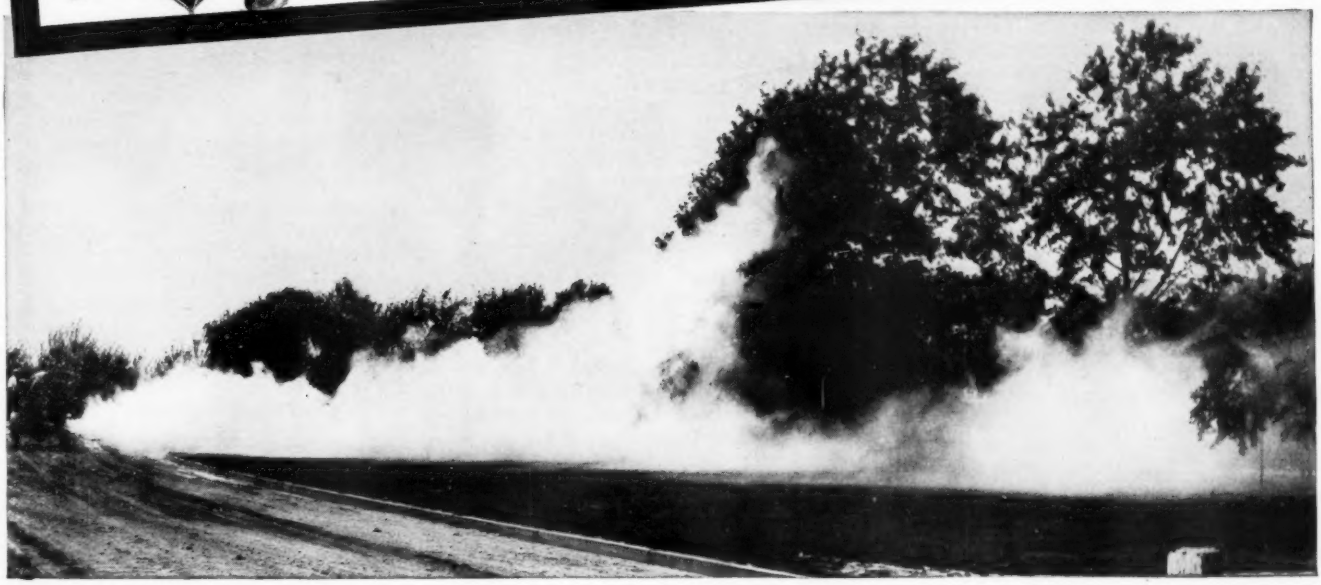
The time-honoured custom of airing and brushing clothes which are not in daily use has much to commend it.

Insect-free storage for woolens which are not in use is another preventive measure by which these pests may be foiled. Any tight trunk or box is suitable. Only cleaned articles should be stored and they should all be examined at the time of storing. The addition of about 8 ounces or more of paradichlorobenzene or naphthalene flakes to the top of the trunk or scattered through the contents will prevent damage. As an added precaution the lid of the trunk should be taped to the lower section by means of medical adhesive tape.

Mothproofing is another preventive treatment which defeats the fabric pests when properly carried out. It may be done by the dry-cleaner when the garments or blankets, etc., are cleaned or laundered, or it may be carried out at home by immersion or spraying. The number of alleged mothproofing agents is legion and they vary from very good to worthless. Some are applied from organic solvents and others as water solutions.. Among the better ones are the fluosilicates although some of the other materials are also excellent. Subsequent dry cleaning and laundering reduce the protective properties. Guarantees for the life of the garment are meaningless unless the treatment is repeated at intervals to renew the protective properties.

The public storage of furs and other commodities susceptible to attack by fabric pests is a large scale business and where properly carried

# "Yes, sir . . . THAT TIFA FOG GETS THOSE PESTS!"



## . . . DEATH-DEALING FOG FOR INSECTS

*TIFA* is the *Quick . . . Sure . . . Economical* method of insect pest control.
TIFA discharges newly developed as well as the older insecticides, fungicides, repellents or hormones in a *true fog* that *spreads quickly* over a wide area . . . *clings* to all objects in its path . . . *permeates* the smallest crevices.
TIFA . . . a compact, easily handled one-man unit, powered by a standard-make gasoline engine . . . can be used wherever insect pest control is essential . . . on garbage or fill dumps, in swamps, parks, resorts, orchards, barns, corrals, houses and buildings of all sizes and types . . . and for crops and livestock. And it's BUILT TO LAST.

TIFA

**TODD INSECTICIDAL FOG APPLICATOR**

*Write for illustrated folder on sensational TIFA . . . full details on how it operates, what it does, and official comments on its astonishing effectiveness.*

**A Product of**

**COMBUSTION EQUIPMENT DIVISION**

**TODD SHIPYARDS CORPORATION**

**81-16 45th Avenue, Elmhurst, Queens, N. Y.**

out, a distinct service is rendered.

There are two types of storage: (1) low temperature, and (2) fumigated.

In the first case the garments and other articles are held at temperatures slightly above the freezing point which renders the insects inactive but does not necessarily kill them. Failure of the refrigeration equipment could cause trouble.

In the fumigated storage, the usual plan is to fumigate the garments as they are received from the customers and then store them at room temperature. In the better storages, the storage rooms are fumigated periodically to insure that no infestation occurs during storage. Repeated fumigation does not appear to have any deleterious effect on furs or other garments.

Carpet beetles in commercial establishments such as woolen mill storages and manufacturing plants can cause considerable damage. All of the good housekeeping practices detailed for the home should be religiously applied. Good housekeeping is very important and the premises should be kept scrupulously clean at all times. All incoming material should be carefully examined to prevent the introduction of pests. Where infestation becomes well established, much work is often entailed in freeing the premises of insects by curative measures.

**Food Pests**—The only food pest in this group likely to be encountered in the home is the larder beetle. The general use of refrigeration, the purchase of meats in small quantities and the fact that the home curing of meat is practically a lost art, have resulted in a great decrease in the damage caused by this insect. It is now more likely to be introduced into the home with dog or cat food than otherwise. A careful inspection of these commodities should always be made to avoid such a happening.

The commercial food establishments fall into three classes dependent on the products handled: (1) cereals, (2) milk powder, (3) meats. Here again the general practice of good housekeeping and careful inspection will usually keep the premises in good condition. In the cleaning of premises the use of industrial types of vacuum cleaners is highly recommended as such equipment readily removes insects and loose food accumulations from cracks, etc.

**Curative Measures**—Time spent in making a thorough examination of the premises to determine the source of infestation is well spent. There are many sources of infestation, insulation or sound proofing material of animal or vegetable origin, dead animals, birds nests, accumulations in floor cracks, ventilators, or behind baseboards which may account for the Dermestid infestation. If the infestation is well established, the insects will be widely distributed and in highly inaccessble places. Carpet beetles are perhaps the hardest to kill of all household pests. Whatever the treatment used, **don't economize on the material and make a really thorough application.**

**Fumigation**—This is the preferred treatment and an extra heavy dosage should be used. Hydrocyanic acid gas and chloropicrin have both been used successfully against these pests. Mallis (3) recommends that a dosage of 24 ounces of liquid HCN or 32 ounces of discoids or eggs should be used per 1,000 cubic feet with a full 24 hour exposure period. Chloropicrin should be used at the rate of at least 1 ½ pounds per 1,000 cubic feet for the same length of time. A few cautions should be sounded. Always loosen door treads in all fumigations against these pests. The best results with fumigation are secured during the warmer months of the year. There is a much higher percentage of failure during cold weather. Pay particular attention to the basement and attic as these two spots are often the locations responsible for the trouble.

For limited infestations, contact sprays may be used. The carrier should be the stainless odourless type of oil and a strong spray should be used. We find with contact sprays generally that one gallon of a 10 percent spray of extract of pyrethrum 20 is much more effective than 2 gallons of a 5 per cent spray. If thiocyanate is employed, use a corresponding amount of it. A combination type spray of the type mentioned in which enough DDT is incorporated to yield a residual effect should give very superior results.

The success of any spray treatment will depend very largely on the thoroughness with which it is applied behind moulding, baseboards, under thresholds, and into cracks. Even when a good job is done it may be necessary to repeat the treatment to secure adequate control.

The use of certain dusts would appear to have considerable merit also. Recently seedsmen have been treating seeds with micronized magnesium oxide and aluminum oxide to protect seed from attack by Dermestids and other insects with marked success. We have found the treatment very satisfactory against stored product pests in warehouses. Some of the light infestations or spots where trouble appears after fumigation can probably be handled by careful treatment with magnesium oxide. The dust is nonpoisonous and one application in spots where it will not be disturbed will be effective for a long time.


**REFERENCES**

(1) Heal, R. E., 1942, Evaluating Protection of Fabrics from Clothes Moth and Carpet Beetle Attack. Jour. Econ. Ent., 35(2): 249-255.

(2) Hinton, H. E., 1945, Monograph of the beetles Associated with Stored Products. British Museum (Natural History), London, England.

(3) Mallis, Arnold, 1946, Handbook of Pest Control. McNair & Dorland Company, New York City.

(4) Wodsedalek, J. E., 1912, Life History and Habits of **Trogoderma tarsale** Melsh, a Museum Pest. Annals of the Ent. Soc. of America, vol. 5, pp. 367-381.

1917, Five years of Starvation of Larvae of **Trogoderma tarsale.** Science, vol. 46, pp. 366-367.


---

### Research Summary

*PRELIMINARY STUDIES ON THE CONTROL OF BLOWFLIES WITH DDT by W. C. Baker, Senior Assistant Sanitary (R), and L. G. Schwartz, Junior Biologist, U.S.P.H.S.*

"Preliminary tests were made with DDT for the control of blowflies at a fish market, an abattoir, a hide-processing plant, and a seafood plant, using a 5 per cent DDT-xylene-Triton X—100 emulsion applied at a rate of 200 and 300 mg. DDT per square foot. The variation in the degree of control achieved was dependent to a large extent on the relationship between the night resting places of the flies and the extent to which such places were treated. At establishments where only the area about the daytime feeding places of the blowflies was treated, control was obtained for a 2- to 3-week period. At establishments where the night resting places were treated in addition to the area around the daytime feeding places, effective control of the blowflies was obtained for periods up to 3 months."

*Public Health Reports, Vol.* 62; 5-30-47; *No.* 22.

---

### Rat Problem in Buffalo

BUFFALO: This city, according to one of its councilmen as reported in John Gunther's "Inside USA," has the worst rat problem of any American city; its rats "take the top off the peanut butter jars and dive into the Buffalo River and catch fish."

---

### House Fly

**According to Monsanto Magazine, if one pair of ordinary houseflies beginning in April multiplied unmolested, and if all were to live, their progeny would be 191,010,000,000,000,000,000 flies by August. Allowing one-eighth cubic inch to a fly, this number would cover the earth 47 feet deep.**

# Inquiries Invited!

# SOLVAY

TRADE MARK REG. U. S. PAT. OFF.

# ORTHO-DICHLOROBENZENE

. . . odor controls

. . . termite controls

. . . sprays

*Shipped in Tank Cars and Drums*

**SOLVAY SALES CORPORATION**

*Alkalies and Chemical Products Manufactured by The Solvay Process Company*

**40 Rector Street** **New York 6, N. Y.**

**BRANCH SALES OFFICES:**

Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit
Houston • New Orleans • New York • Philadelphia • Pittsburgh
St. Louis • Syracuse

# The Techniques of Application and the Control of Roaches and Bedbugs With DDT*

By ROBERT L. STENBURG, Assistant Engineer (R),
United States Public Health Service

ALTHOUGH it has not been definitely shown that roaches are significant vectors in the transmission of disease, their frequent occurrence in human habitations where they may contact food after encountering garbage and other filth renders it probable that diseases may be mechanically transmitted by these insects. Considerable evidence exists regarding the high toxicity of DDT to flies and mosquitoes, but there have been contradictory reports regarding its effectiveness against roaches. Therefore, additional information on this subject was deemed desirable.

On the basis of these considerations, some work was done to determine (1) the most effective techniques of applying DDT for roach control, and (2) the effectiveness of DDT against the German roach, **Blattella germanica** (Linn.), and the American roach **Periplaneta americana** (Linn.).

The tests were in general designed to duplicate conditions encountered by the users of commercially distributed DDT. All experimental applications were made in operating establishments, such as houses, apartments, grocery stores, restaurants, meat markets, hotels, and hospitals. Five-per cent-DDT liquid spray and 10-per cent-DDT dusting powder were selected for most experimental treatments, since these concentrations now appear to be more or less standardized in commercial insecticides.

## Procedure

**Sampling methods, trapping**—Inasmuch as a proper evaluation of DDT applications would depend on the accurate sampling of roach populations both before and after treatment, some method of counting was required. Trapping of roaches was initially selected as a method for determining the index of the infestation in any one locality. Small screen cages, 5 inches high and 4½ inches in diameter with funnelshaped inlets, were used as traps. With a few bread crumbs inside to serve as bait, the cages were left overnight in drawers, cupboards, trunks, or boxes, and on tables or other localities where roaches existed. Although pretreatment trapping proved adequate for sampling certain localized infestations, this method of approximating roach populations was abandoned for the following reasons:

1. The cages trapped sufficient numbers of roaches to deplete the pretreatment populations. It was not deemed advisable to release the trapped roaches because of the adverse effect this would have had upon the householder, whose cooperation was essential, not to mention the possible effects the trapping might have had upon the behavior of the roaches themselves.

2. The traps proved to be unsatisfactory when populations were sparse. This became a consideration in posttreatment sampling because, ordinarily, populations were so reduced after treatment that in many cases no roaches entered the traps, even though a small degree of infestation still existed.

3. The selection of trapping sites was often difficult because the sphere of activity of German roaches appeared to be quite limited, and any one trap sampled only those roaches existing in a certain localized area, such as one section of a cupboard, one drawer, or perhaps a table. When a local infestation was completely eliminated by the treatment, infestations remaining in other parts of a room were not sampled by traps placed in pretreatment locations.

4. Unless cages were located so that they remained in semidarkness during daylight, the roaches escaped from the traps. This meant that infestations existing on tables and open shelves were not easily sampled.

**Counting by Inspection**—Since trapping did not prove satisfactory, a more direct method of approximating total populations was employed. Thorough inspections were made of cupboards, refrigerators, stoves, trunks, boxes, drawers, tables, chairs, and shelves; and every accessible crack and crevice was thoroughly examined with the aid of a flashlight Occupants were questioned about any roaches they might have seen either during the day or at night, and while their reports were not entirely relied upon, they were neverthelss helpful to the inspector in locating remaining nests of roaches. On the basis of these infestation counts, premises were classified into one of the four following groups:

**Class A**—No roaches in evidence according to weekly examinations by inspector and reports of occupants.

**Class B**—Roaches do not constitute an obvious nuisance but are present. Weekly observations of inspector and reports of occupants show at least one, but less than five, roaches in any one room of a premise.

**Class C**—Roaches are approaching the nuisance stage. They are seen three or four at a time in cupboards, drawers and tables. This classification includes premises showing more than 5 roaches, but less than 50, in any one room as reported by inspector.

**Class D**—Roaches are definitely a nuisance and are too numerous to count in any one room of a premise.

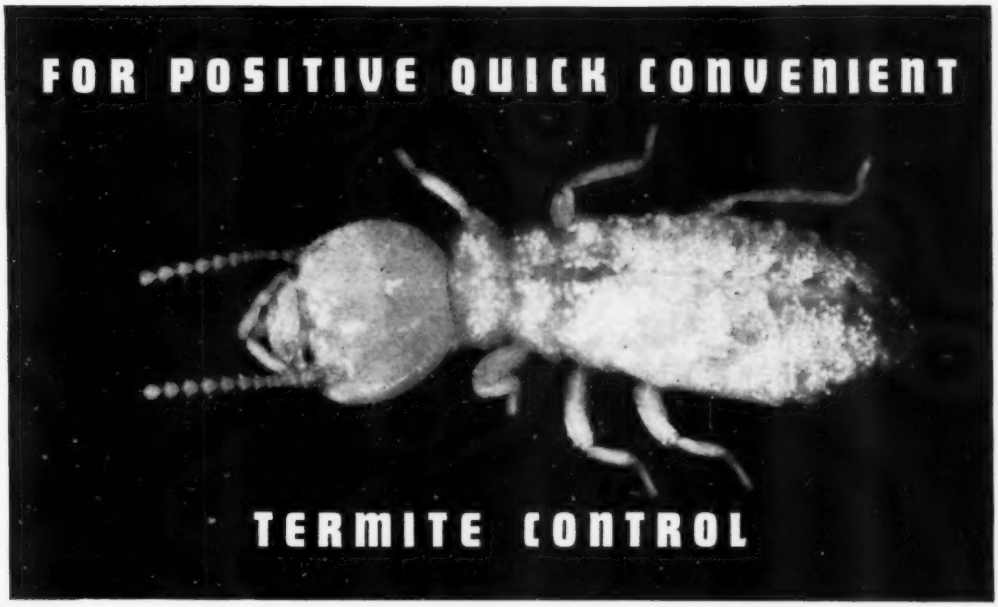
These classifications were applicable to pretreatment and posttreatment populations but gave greater accuracy to posttreatment counts, which were usually in class C or better, whereas practically all pretreatment infestations were in class D. It is realized that this method could not account for every roach in a premise, but inspections were sufficiently thorough to insure locating those in the more obvious hiding places, and was considered entirely adequate for the purposes of this study.

In working out a satisfactory method of applying DDT to control roaches effectively, five general methods were investigated. During the treatment of all premises, every precaution was taken to keep DDT from getting on dishes, cooking utensils, or uncovered food.

**Method 1—Over-all spraying with 2½-per cent DDT.**—Several private houses were treated so as to duplicate the treatment used by the Malaria-Control-in-War-Areas (MCWA) program for mosquito control. This method consisted of spraying the ceilings and walls of an entire house with 2½-per cent-DDT-xylene-Triton X-100* emulsion to give a deposit of 100 mg. of DDT per square foot. In attempting to make this type of treatment more effective against roaches, additional spray was applied to the undersides of tables as well as to insides of drawers, cupboards, and closets where roaches were in evidence. Many roaches were killed during the treatment and others continued to die in decreasing numbers for as long as 4 weeks after treatment

*From Communicable Disease Center, Technical Development Division (Savannah, Ga.), States Relations Division.

*Manufactured by Rohm & Hass Co., Philadelphia, Pa.




# CHAPMAN "PENTA" PRESERVATIVE

**POSITIVE**

***in results.*** Exhaustive tests and commercial use over a period of 10 years have proved that Chapman "Penta" Preservative provides dependable protection against termites. "Penta" Preservative contains pentachlorphenol, extremely toxic to termites.

**QUICK**

***in action.*** Used as a soil poison, "'Penta" Preservative rapidly penetrates and poisons the ground. Termites need only touch "Penta" Preservative with feelers, legs or bodies to be poisoned. Swabbing or spraying the wooden structure with "Penta" Preservative provides an additional safeguard, also preserves the wood from decay and rot. Thorough treatment is effective for years.

**CONVENIENT**

***in application.*** Chapman "Penta" Preservative is colorless, almost odorless, and clean to handle. Treated wood is not damaged or discolored, and takes paint, varnish or stain.

For the whole story on termites—and how you can give your customers maximum protection against them with Chapman "Penta" Preservative—write for our free literature.

Here's Sales Help
for Pest Control Operators

Chapman has prepared this attractive mailing piece to help you sell your services. Write for details.

CHAPMAN

**CHAPMAN CHEMICAL COMPANY**

**333 North Michigan Avenue, Suite 534, Chicago 1, Illinois**

"PENTA" PRESERVATIVE CONTAINS PENTACHLORPHENOL,
PRODUCT OF THE DOW CHEMICAL COMPANY

However, it was 2 or 3 weeks before class D infestations of German roaches were reduced to Class C, and reduction beyond class C seldom occurs with this method. American-roach infestations dropped to class B in 3 weeks and to class A in 8 weeks.

**Method 2—Over-all spraying with 5- and 10-per cent DDT**—Another group of houses was sprayed in the manner described above, except that 5- and 10-per cent concentrations of DDT-xylene were used to obtain 200 and 440 mg. of DDT per square foot, respectively. Roach mortalities resulting from these higher concentrations were approximately the same as those obtained with the 2½-per cent spray, in that infestations were reduced considerably, but not as quickly or as completely as seemed desirable. Class D infestations of German roaches were reduced to class C after 1 or 2 weeks, but there was no further reduction during the course of study. Five-per cent spray applications reduced class D infestations of American roaches to class B in 3 weeks, whereas 10-per cent spray reduced class D infestations of American roaches to class B in 1 week.

**Method 3—Application of 10-per cent-DDT dust to obvious resting places**—In a third group of houses only infested rooms were treated with 10-per cent-DDT powder (90-per cent powdered pyrophyllite), which was applied with a Getz* heavy-duty blower to cupboards, drawers, shelves, boxes, ledges, corners, and to all cracks around moulding, door frames, and window frames. These applications reduced the American-roach infestations to class A in 3 weeks. The number of German roaches was reduced greatly, but class D infestations did not drop to class C until 3 or 4 weeks after treatment.

These preliminary experiments made it apparent that over-all spraying of walls and ceilings with specific dosages of DDT or the application of 10-per cent-DDT dust to the more obvious hiding places did not produce entirely satisfactory results. For example, American-roach infestations were reduced only from class D to class B in 1 to 3 weeks; whereas in the case of German roaches, 1 to 4 weeks was required to reduce a class D infestation to class C, and reduction beyond class C seldom occurred.

In most cases in which German roaches still existed in a premise 4 or more weeks after treatment, the remaining infestation occurred in a few localized spots which apparently had not received a thorough treatment. Further observations indicated that the dust applications were more effective against American roaches than against German roaches, partly because the former species seemed to travel greater distances and thus increased their chances of encountering the dust. German roaches appeared to move only short distances from their resting places and apparently always returned to approximately the same place.

**Method 4—Combined use of 5-per cent-DDT spray and 10-per cent-DDT dust**—On the basis of the foregoing tests and observations, a treatment technique was adopted which attempted to apply heavier dosages of DDT (particularly in the form of 10-per cent DDT dust) to more concentrated areas, and especially to the daytime resting places of German roaches.

In the fourth series of tests, only infested rooms were treated with a combination of 5 per cent-DDT liquid spray and 10-per cent-DDT dust. This technique took advantage of the fact that roaches were driven from their resting places by xylene or other pungent DDT-spray solvents. All surfaces exhibiting cracks which might harbor roaches were sprayed. This included stoves, tables, chairs, refrigerators, cupboards, cabinets, shelves, sinks, trunks, and drawers. Most of the walls were treated thoroughly, particularly around window and door casings and around baseboards. Cracks in floors or floor coverings were treated when necessary. Ceilings were treated only if they had obvious cracks. As roaches emerged from hiding, their resting places were located, whereupon 10-per cent DDT dust was applied. Particular care was taken to dust every crack around sinks, and in tables, refrigerators and food cupboards. Shelves, cupboards, and drawers that could not be sprayed were dusted, and an application of dust was made under all furniture under which the floor was not regularly swept.

This technique produced excellent results in private houses and was therefore tried in commercial establishments, including restaurants, grocery stores, meat markets, hotels and hospitals. In the majority of cases, infestation of German roaches were reduced from class D to class B within 1 week, the greatest mortality occuring within 3 or 4 days. Four weeks after treatment, class A conditions existed in two-thirds of the places treated, and the remainder were class B. In all but three cases, American-roach infestations were reduced from class D to class A or B within 1 week after treatment.

**Method 5—Multiple spraying of infested areas**—An alternate method of applying larger dosages of DDT to more concentrated areas was tried, and although it was not as satisfactory as method 4, it is of interest because of the results obtained.

Infested rooms in a fifth group of houses were sprayed with 2½-5-, and 10-per cent concentrations of DDT in a xylene-water emulsion. When an infestation was encountered, the locality of the infestation was sprayed three or four times, in order to kill as many of the emerging roaches as possible with the oil spray and, simultaneously, to leave a heavy deposit of DDT crystals on or near the resting place. This method gave better results than the controlled-dosage spraying, but was not as effective as the combination spray-and-dust method. The main objection to this type of treatment was the mess which resulted from drenching walls and furniture with DDT spray. It could be used only in very poor quality establishments.

**General Discussion and Suggestions**

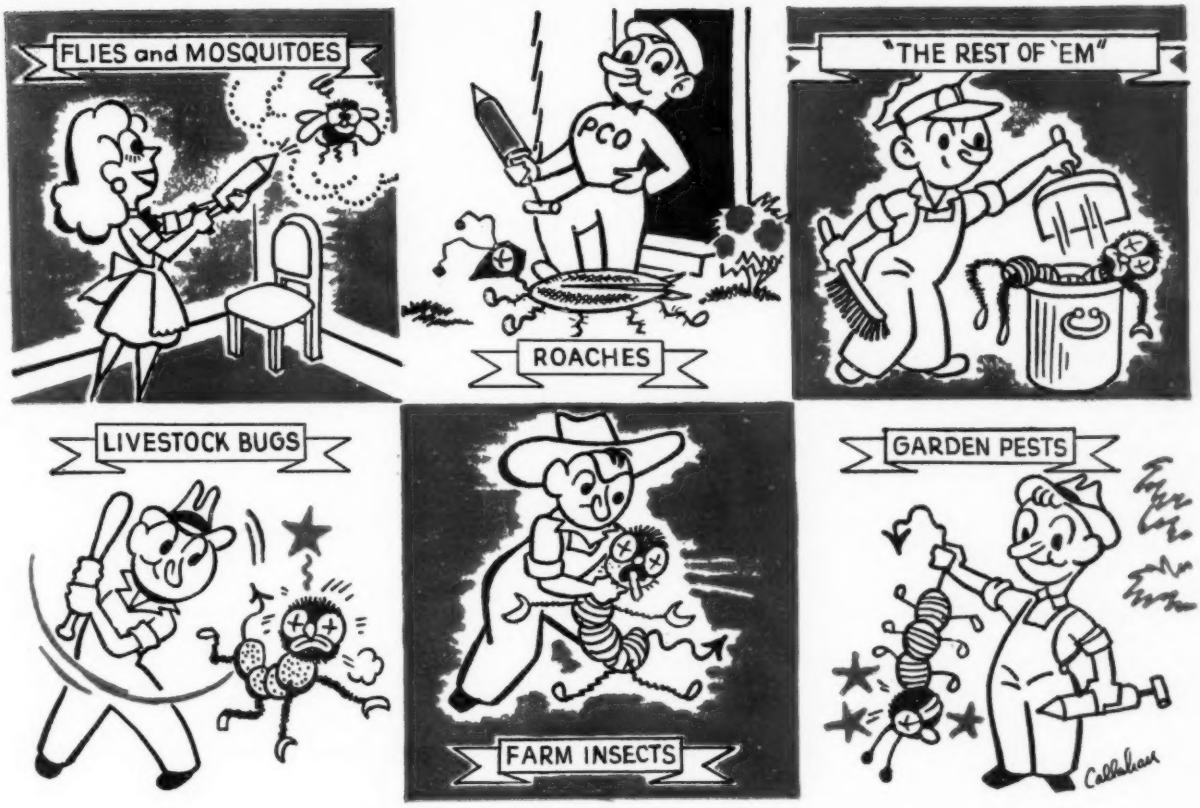
Method 4, as described above, applied particularly to the treatment of private houses, and when other types of establishments were treated, certain variations in technique were found to be necessary. In kitchens of restaurants, hotels and hospitals, where roaches were found mostly around sinks and shelves, or in tables and benches used for preparing and storing food, special care was taken to protect all food and dishes before spraying.

Infestation in hospital rooms usually resulted from food and crumbs being dropped by patients eating in bed. Heavy infestations existing in bedsprings were eliminated by repeated applications of 5-per cent-DDT spray as described in method 5. This left a comparatively heavy deposit of DDT crystals on the bedsprings.

Infestations in hotel rooms were usually traced to food in the room and were eliminated by the treatment outlined under method 4.

Control of both species of roaches in grocery stores and meat markets required greater dependence on the 10-per cent-DDT powder than on the liquid spray. Meat counters and cold-storage boxes were sprayed, but only dust was applied to shelves, cash

*Manufactured by Getz Exterminators, Inc. St. Louis, Mo.




# PENICK SUPER INSECTICIDE BASES FOR SUPER CLEAN-UP JOBS

Whether it's for the housewife, or the PCO, or compounded for the farmer or warehouse owner, Penick has a suitable basic insecticide that, when mixed to the necessary strength for the particular job, will *knock down* and *knock out* pests and vermin.

| | |
|---|---|
| For house fly and mosquito | Pyrexcel, Pyrefume Super 20 |
| For roaches and other household pests | Pyrexcel, Pyrethrum, Impregno and DDT |
| For large-acre farms | Pyrexcel, DDT, Pyrethrum and Rotenone |
| For livestock sprays | Pyrexcel, DDT and Pyrefume Super 20 |
| For plant sprays | Pyrexcel, Foliafume |
| For gardens, greenhouses and nurseries | Pyrexcel, Pyrethrum Extract |
| For rats and mice | Red Squill and Rodine (liquid extract of red squill) |
| For cotton insects, grasshoppers, cattle and chicken lice and sarcoptic mange of hogs | Benzene Hexachloride |

**May we suggest you investigate the advantages of PYREXCEL—excellent performance—lower cost.**

## S. B. PENICK & COMPANY

50 CHURCH STREET
NEW YORK 7, N. Y.
Telephone: COrtlandt 7-1970

735 W. DIVISION ST.
CHICAGO 10, ILL.
Telephone: MOHawk 5651

registers, inside spools of wrapping paper, and wherever possible behind and under display cases. Ten-per cent DDT dust was also applied on and between packages and crates in storage rooms.

Special treatment was necessary in two cases in which American roaches entered houses from outside, even after 10-per cent-DDT dust had been applied to closets, under electric stoves and refrigerators, behind cupboard drawers, and in attics. These inside treatments partially reduced the number of American roaches observed by the occupants at night. Therefore an outside application of 5-per cent-DDT spray was made to incinerators, garbage disposals, garages, and outside lavoratories. Wherever roaches were driven out of hiding by the spray, 10-per cent-DDT dust was applied. Additional dust applications were made on the steps and porches, as well as to the ground immediately surrounding the houses. The following day, many dead roaches were counted as a result of this treatment, and the occupants did not report roaches inside the house for the duration of the study.

TABLE 1.—*Infestation classifications of American roaches before and after various methods of DDT treatment*

| Test number [1] | Type of establishment | Type of DDT treatment | Extent of treatment | Classification of infestation | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Before treatment | Time after treatment (in weeks) | | | | | | |
| | | | | | 1 | 2 | 3 | 4 | 8 | 12 | 16 |
| 1-1A | House | 2½-percent spray | Entire house | D | C | C | B | B | A | A | A |
| 2-1A | do | 5-percent spray | do | D | C | C | B | B | A | A | A |
| 2-2A | do | do | do | B | A | A | A | A | A | A | A |
| 3-2A | do | 10-percent dust | Kitchen and bedroom. | D | B | B | A | A | A | A | A |
| 4-1A | Grocery store. | 5-percent spray, 10-percent dust. | Store and storeroom. | D | B | B | B | B | A | A | A |
| 4-2A | do | do | do | D | B | A | A | A | B | A | A |
| 4-3A | do | do | do | D | C | C | C | C | B | A | A |
| 4-5A | Meat market | do | do | D | A | A | A | A | A | A | A |
| 4-6A | House | do | Kitchen | D | B | B | B | B | A | A | A |
| 4-9A | do | do | do | C | A | A | A | A | A | A | A |
| 4-10A | do | 10-percent spray, 10-percent dust. | Kitchen and outside. | D | C | C | C | B | B | A | A |
| 4-11A | do | do | Kitchen | C | A | A | A | A | A | A | A |
| 4-12A | do | 5-percent spray, 10-percent dust. | do | C | B | B | B | B | A | A | A |
| 4-13A | do | do | do | C | B | A | A | A | A | A | A |
| 4-14A | do | do | Entire house | D | B | B | A | A | A | A | A |
| 4-15A | do | do | Kitchen and porch | D | B | B | B | B | A | A | A |
| 4-16A | do | do | do | D | B | B | B | B | A | A | A |
| 4-21A | do | do | Kitchen and outside. | D | C | B | A | A | A | A | A |
| 4-22A | Hospital. | do | Entire building | D | B | A | A | A | A | A | A |
| 4-23A | Restaurant. | do | Kitchen and storeroom. | D | A | A | A | A | A | A | A |
| 4-24A | do | do | do | D | B | A | A | A | A | A | A |
| 5-3A | House | 5-percent spray | Kitchen | D | A | A | A | A | A | A | A |
| 5-5A | do | do | do | D | A | A | A | A | A | A | A |
| 5-7A | do | 10-percent spray | do | D | A | A | A | A | A | A | A |
| 5-8A | do | do | do | D | B | B | A | A | A | A | A |

[1] First digit in this number refers to the method of treatment as numbered in the text.

### Results of Roach Control

A complete summary of all tests made during this study is included in tables 1 and 2.

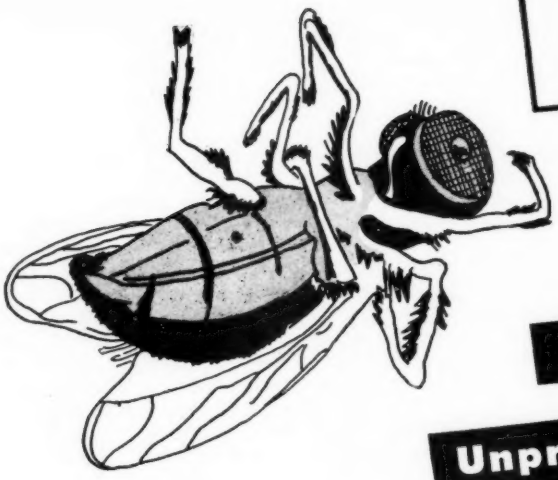
When over-all spraying of regulated dosages (100, 200, and 400 mg. of DDT per square foot) were applied to all rooms of infested houses as described in methods 1 and 2, several hundred German and American roaches, comprising class D infestations, were killed. Many roaches were not killed during these treatments, but some continued to die each day for about 2 weeks. In some cases dead German roaches were found for as long as 4 weeks after treatment. Infestations of American roaches were reduced to class A or class B, 3 or 4 weeks subsequent to treatment, and this control continued for the duration of the 16-week study. Class D German-roach infestations required from 1 to 3 weeks for reduction to class C, and seldom dropped below class C during the period of study.

Dusting of the more obvious resting places in infested rooms with a 10-per cent DDT powder, as described in method 3, likewise resulted in a heavy mortality immediately after treatment. This method was particularly effective against American roaches, which were reduced from class D to class B in 1 week and often to class A in 3 weeks. The mortality of German roaches was also high immediately after treatment. Noticeable numbers of dead roaches were observed on the floors for about 3 weeks, at which time the infestation dropped from class D to class C. No further reduction in the classification of the German-roach infestation resulted during the course of the study.

In the combined use of 5-per cent-DDT spray and 10-per cent DDT dust, as described in method 4, the greatest mortality of both species occured immediately after treatment. Roaches continued to die for 3 or 4 days, but after 1 week very few dead roaches were seen. With few exceptions, class D infestations of German and American roaches in all types of establishments were reduced to class B or better in 1 week, and, in the majority of places treated, class A conditions existed within 4 weeks after treatment. No evidence of reinfestation of either species was noted at any time during the study. The greater effectiveness which this method of treatment appeared to have over other methods tried, resulted chiefly from the fact that, insofar as possible, every nest of roaches was sought out and thoroughly dusted with 10-per cent-DDT powder, whereas other methods of treatment relied to a great extent upon the roaches sooner or late passing over a locality having sufficient DDT to be toxic.

Repeated spraying of areas where roaches were encountered, as described in method 5, had the double advantage of killing many roaches with the DDT solvent as they emerged from hiding and simultaneously depositing heavier dosages of DDT crystals in the locality of the resting places. The results obtained using 2½-per cent concentrations were not as satisfactory as those when 5- and 10-per cent spray concentrations were used. With the two latter concentrations, some class D infestations of American roaches were reduced to class A in 1 week, whereas others required 3 weeks. German roaches were often reduced to class B or C infestations after 2 or 3 weeks. In general, the control which could be expected from this type of treatment was not as reliable as the combined use of spray and dust. Excellent results were obtained, however, in test No. 5-6 (table 2), in which an infestation of several thousand German roaches was reduced to class A 3 weeks after treatment During the following 7 months no roaches were seen in this place by either occupant or inspector, although the type of housekeeping which permitted such an infestation to develop still existed.

In the two cases in which outside treatments were made in an effort to control American roaches which



# FLY-PROOFING

## Incredible Results!

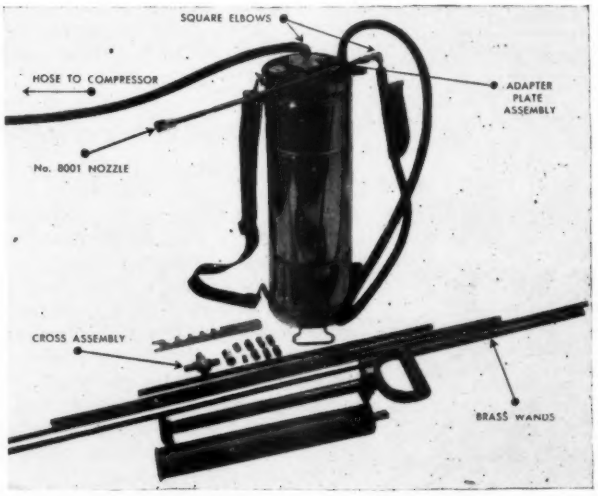
## Unprecedented Profits!

**"FLY-PROOFING" with the "CHEMISTE SCIENTIFIC PROCESS" offers tremendous NEW PROFITS to Pest Control Operators. A few territories still open for exclusive service franchises. In "OPEN" territory our process is available to all.**

**Our process affords 100% control of flies for a period of months with a single application. It is completely SAFE TO USE!**

**One gallon of "CHEMISTE" concentrate makes five gallons of full strength solution. Add four parts water, nothing else to buy. Our Chicago experience proves that "FLY-PROOFING" rates will return $10.00 to $15.00 for each gallon of diluted solution used . . . or $50.00 to $75.00 per gallon of concentrate. Add $25,000.00 or more to your 1947 income with our proven method of Fly conrrol.**

## "CONTINENTAL" supplies everything needed for FLY-PROOFING work!




**FLIES and most other flying insects CANNOT LIVE IN PREMISES TREATED WITH . . .**

### ORDER FROM THIS LIST

| | |
|---|---|
| "CHEMISTE FLY-PROOFING CONCENTRATE" in 30 or 55-gallon drums, per gallon, FOB Chicago (add $4.00 deposit for each steel drum) | $6.40 |
| CONVERTED LOFSTRAND SPRAYER for compressor operation, complete with machined brass Adaptor Plate assembly, 2 square elbows and all fittings required | $31.75 |
| COMPLETE PUMP ASSEMBLY to convert Lofstrand unit to hand operation | $7.00 |
| 5 BRASS EXTENSION WANDS (two 24", two 48" and one 36"), sufficient to reach the highest ceilings and walls, plus 6 connector couplings | $8.82 |
| No. 8001 FLAT SPRAY NOZZLES, the special nozzle that has proved correct and dependable for fly-proofing work, each | $2.50 |
| CROSS ASSEMBLY permitting 1 to 3 sprayers to operate from single ¼ h.p. compressor unit | $1.68 |

**COMPLETE DIRECTIONS FURNISHED**
for organizing fly-proofing service in your territory. No experience necessary.

**WRITE • WIRE • PHONE**

**CONTINENTAL CHEMISTE CORPORATION**
**2068 W. Ogden Avenue, Chicago 12, Illinois**

**The Chemiste SCIENTIFIC PROCESS**
SAY "SHEM-EAST"

had been entering the houses at night, over 300 dead roaches were counted around the garages, incinerators, and garbage disposal units of each of the two premises. The treatment, which consisted of 5-per cent-DDT spray applications followed by extensive dusting with 10-per cent-DDT powder, apparently eliminated or greatly reduced the source of infestation, since no roaches were seen in either dwelling thereafter.

### Bedbug Control

Eradication of bedbug infestations has been difficult in the past because some bedbugs would leave beds and furniture to hide in the cracks of walls and floors where they were not affected by the petroleum insecticides sprayed on the beds, mattresses, furniture, and wall surfaces.

DDT overcomes this difficulty because of its lasting toxicity, and many studies already conducted have shown that DDT is the most effective insecticide yet used against bedbugs. (1, 2, 3, 4, 5).

In this study the extent and type of treatment was varied, different solvents were used, and various concentrations of DDT were applied, in an effort to determine the importance of these factors in bedbug control when DDT is used under practical conditions, i. e., by the householder. Observations were also made on the advantages or disadvantages in the use of various types of sprayers and nozzles.

All spray applications were made in dwellings in which bedbug counts had been made on mattresses, beds, and furniture prior to spraying. After spraying, inspections were made once each week for 16 weeks.

**Procedure**—Premises were divided into groups, according to the extent of the DDT treatment applied in each house, as follows:

1. Mattresses were sprayed on both sides and around the edges. No other spraying was done in houses of this group.
2. Mattresses and bedsprings were sprayed.
3. Mattresses, bedsprings, and bedsteads were sprayed. Treatment of bedsteads consisted of spraying chiely into cracks on the inside of sideboards, as well as into the joints where sideboards fasten to bed ends.
4. Entire beds, including mattresses, bedsprings, and bedsteads, were sprayed, as were the walls of the bedroom.
5. Walls and ceilings of the entire house were sprayed, together with all chairs, divans and beds.

**Sprayers and nozzles**—In the treatment of beds and mattresses, the 1-quart-capacity "Sure Shot Milwaukee" sprayer was tried, but the majority of spraying was done with the 4-gallon-capacity knapsack type of compressed-air sprayer. Use of the "Sure Shot" sprayer resulted in very little waste of spray, but considerable time was consumed in making the applications. The knapsack-type sprayer, equipped with an atomizing nozzle, producing a flat fan spray pattern of approximately 50° and having a discharge rate of one-tenth gallon per minute at 40 pounds' pressure, appeared to be the most suitable for quick and thorough treatment of beds. With this nozzle, most surfaces could be given an even application of spray without getting them too wet and without excessive waste. Nozzles of the same type, having wider spray angles and higher discharge rates, left surfaces too wet and were found to result in excessive waste of spray.

TABLE 2.—*Infestation classifications of German roaches before and after various methods of DDT treatment*

| Test number | Type of establishment | Type of treatment | Extent of treatment | Classification of infestation | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Before treatment | Time after treatment (in weeks) | | | | | | |
| | | | | | 1 | 2 | 3 | 4 | 8 | 12 | 16 |
| 1-1 | House | 2½-percent spray | Entire house | D | D | D | C | C | C | C | C |
| 1-2 | do | do | do | D | D | C | C | C | C | C | C |
| 1-3 | do | do | do | D | D | C | C | C | C | C | C |
| 2-1 | do | 5-percent spray | do | D | D | C | C | C | C | C | C |
| 2-2 | do | do | do | D | C | C | C | C | C | C | C |
| 2-3 | do | 10-percent spray | do | D | C | C | C | C | C | C | C |
| 3-1 | do | 10-percent dust | Kitchen and pantry. | D | D | D | C | C | C | C | C |
| 3-2 | do | do | Kitchen and bedroom. | D | D | D | D | C | C | C | C |
| 4-1 | Grocery store. | 5-percent spray, 10-percent dust. | Store and stockroom. | D | C | B | B | B | A | A | A |
| 4-2 | do | do | do | D | C | C | B | B | B | A | A |
| 4-3 | do | do | do | D | C | B | B | A | A | A | A |
| 4-4 | do | do | do | C | B | A | A | A | A | A | A |
| 4-5 | Meat market. | 5-percent spray, 10-percent dust. | Store and stockroom. | D | B | B | A | A | A | A | A |
| 4-6 | House | do | Kitchen | D | B | B | B | B | A | A | A |
| 4-7 | do | do | do | C | B | A | A | A | A | A | A |
| 4-8 | do | do | do | C | B | B | A | A | A | A | A |
| 4-9 | do | do | do | C | B | B | B | B | A | A | A |
| 4-10 | do | 10-percent spray, 10-percent dust. | Kitchen and outside. | C | A | A | A | A | A | A | A |
| 4-11 | do | do | Kitchen | D | B | B | A | A | A | A | A |
| 4-12 | do | 5-percent spray, 10-percent dust. | do | D | B | B | B | B | A | A | A |
| 4-13 | do | do | do | C | B | B | B | A | A | A | A |
| 4-14 | do | do | Entire house | C | B | B | A | A | A | A | A |
| 4-15 | do | do | Kitchen and porch | D | B | A | A | A | A | A | A |
| 4-16 | Apartment house. | do | do | D | B | A | A | A | A | A | A |
| 4-17 | do | do | Kitchen and pantry. | C | A | A | A | A | A | A | A |
| 4-18 | do | do | do | D | A | A | A | A | A | A | A |
| 4-19 | do | do | do | D | B | B | A | A | A | A | A |
| 4-20 | do | do | do | D | B | B | A | A | A | A | A |
| 4-22 | Hospital | do | Entire building | D | C | C | B | B | B | B | A |
| 4-23 | Restaurant. | do | Kitchen and stockroom. | D | B | B | B | A | A | A | A |
| 4-24 | do | do | do | D | C | C | B | B | A | A | A |
| 5-1 | House | 2½-percent spray | Kitchen | D | C | C | C | C | C | C | C |
| 5-2 | do | do | do | D | C | C | C | C | C | C | C |
| 5-3 | do | 5-percent spray | do | D | B | B | B | B | B | B | B |
| 5-4 | do | do | do | D | B | A | A | A | A | A | A |
| 5-5 | do | do | do | D | C | C | C | B | B | B | B |
| 5-6 | do | 10-percent spray | Entire house | D | C | B | A | A | A | A | A |
| 5-7 | do | do | Kitchen | D | C | C | C | C | C | C | C |
| 5-8 | do | do | do | D | B | B | B | B | A | A | A |

### Results of Bedbug Control

Actual counts of bedbugs made in all premises during this 16-week study are summarized in table 3. No bedbug reinfestations occurred during this period, although many of the places treated were immediately adjacent to infested houses in multiple-unit dwellings. In the case of test No. 2-3 (table 3), two treated beds repeatedly showed no bedbugs, whereas inspections of a third untreated bed in the same house showed between 25 and 50 bedbugs each week, during the study.

### Summary

In order to compare the effects of various methods of applying DDT for roach control, pretreatment and post-treatment infestations were classified into one of the four following groups:

A. No roaches evident.

B. One to five roaches per room in evidence.

C. Six to fifty roaches per room in evidence.

D. Roaches too numerous to count.

# The Basic Insecticides you want ..... *when you want them!*

**Call on Prentiss for insecticide concentrates manufactured under the supervision of expert entomologists.**

**PYRETHRUM PRODUCTS**

The time-proved, basic insecticides; safety with maximum knockdown.

**MICRO-MESH DDT POWDERS**

Dust-Base and Wettable grades, formulated in 50% concentrate form.

**DDT LIQUID CONCENTRATES**

30% Oil-Soluble and 25% Water-Miscible, for space and residual sprays.

**CUBÉ POWDER**

Prentiss' exclusive grade—micro-milled, screened, completely fiber-free.

**SABADILLA DUST CONCENTRATE**

The new, activated, insecticide for many chewing and sucking insects.

**CHLORDANE CONCENTRATES**

O-S (oil-soluble) for oil-sprays, or W-M (water-miscible) for economy.

**BENZENE HEXACHLORIDE CONCENTRATES**

Powders and liquids with combined fumigant, contact, stomach toxicity.

**FORTIFIED RED SQUILL**

The positive-action rodenticide that is *safe* for use around foodstuffs.

**TOXAPHENE CONCENTRATES**

Promising new insecticides available now in experimental quantities.

**HEXAETHYL TETRAPHOSPHATE**

For control of red mite—available in quantity for field testing this year.

WHEN you want an insecticide concentrate of any description—call on Prentiss. When you want delivery on positive-time-schedules — call on Prentiss. When you want exact quality-control . . . call on Prentiss. Get the facts for '48. Write for catalog or booklets on any products.

## R. J. PRENTISS & CO., Inc.

110 WILLIAM STREET, NEW YORK 7, N. Y. • 9 S. CLINTON STREET, CHICAGO 6, ILL.

PRENTOX PEST-TESTED INSECTICIDE CONCENTRATES
ARE SOLD TO MANUFACTURERS ONLY

DDT has been used, with a relative degree of success, for controlling German and American roaches in a variety of establishments. Experiments have been conducted wherein infestations of several hundred German and American roaches have been reduced to a negligible number within 1 week after treatment and further reduced after 4 weeks to a point at which, in many cases, no roaches were observed for the remainder of the 16-week study.

Against German roaches, the most satisfactory results have been obtained by the use of a DDT treatment technique involving the spraying of infested rooms with 5-per cent-DDT spray, followed by a thorough application of 10-per cent-DDT dust to every crack from which roaches were driven by the pungent spray. The successful use of this technique required a great deal of attention in the application of dust to cracks around sinks, and in refrigerators, food cupboards, chairs, tables, or benches where food was stored, prepared, or served.

Against American roaches, over-all dusting with 10-per cent-DDT powder of obvious cracks around baseboards, window frames and door frames, as well as applications in cupboards, trunks, cabinets, and drawers, resulted in effective control of American roaches which were living inside the house. American roaches entering the house from the outside were effectively controlled at least for the duration of this study, by treating the outside breeding places, such as incinerators, garages, and garbage-disposal places, with 5-per cent-DDT spray and 10-per cent-DDT dust, supplemented by dusting the ground immediately surrounding the house.

In general, it can be said that American roaches were more effectively controlled with lighter dosages of DDT spray, and less thorough applications of DDT dust, than were German roaches. This was attributed partly to the difference in habits of the two species, the German roach appearing to move only short distances from its resting place, whereas the American roach moves about considerably more and therefore has greater opportunity to enounter DDT in toxic doses.

DDT toxicity to bedbugs was investigated by treating groups of infested houses with various DDT sprays, using different solvents and in concentrations ranging from 2½ to 35 per cent DDT.

Extent of DDT treatment ranged from spraying only the mattress, in the first group of houses, to spraying the entire house and furniture, in the fifth group.

All methods of treatment used resulted in complete control of bedbugs for the duration of the study.

TABLE 3.—*Bedbugs counted before and after treatment with various DDT sprays*

| Test number | Extent of treatment | Solvent | Per-cent DDT | Number of bedbugs counted | | | |
|---|---|---|---|---|---|---|---|
| | | | | Before treatment | After treatment (weeks) | | |
| | | | | | 1 | 8 | 16 |
| 1-1 | Mattress | Xylene | 2½ | 31 | 0 | 0 | 0 |
| 1-2 | do | do | 5 | 117 | 0 | 0 | 0 |
| 1-3 | do | do | 10 | 74 | 0 | 0 | 0 |
| 2-1 | Mattress and bedsprings | do | 2½ | 43 | 0 | 0 | 0 |
| 2-2 | do | do | 5 | 81 | 0 | 0 | 0 |
| 2-3 | do | do | 10 | 240 | 0 | 0 | 0 |
| 3-1 | Mattress, bedsprings, and bedstead | do | 2½ | 62 | 0 | 0 | 0 |
| 3-2 | do | do | 5 | 29 | 0 | 0 | 0 |
| 3-3 | do | do | 10 | 42 | 0 | 0 | 0 |
| 3-4 | do | Kerosene deodorized | 5 | 37 | 0 | 0 | 0 |
| 3-5 | do | do | 5 | 45 | 0 | 0 | 0 |
| 4-1 | Entire bed and walls of bedroom | Xylene | 2½ | 138 | 0 | 0 | 0 |
| 4-2 | do | Velsicol AR-50 (regular). | 2½ | 40 | 0 | 0 | 0 |
| 4-3 | do | | | | | | |
| 4-4 | do | Velsicol AR-50 (regular). | 5 | 48 | 0 | 0 | 0 |
| 4-5 | do | Velsicol AR-50 (special). | 5 | 92 | 0 | 0 | 0 |
| 4-6 | do | Solvesso No. 2 | 5 | 28 | 0 | 0 | 0 |
| 4-7 | do | do | 5 | 39 | 0 | 0 | 0 |
| 4-8 | do | Xylene | 10 | 46 | 0 | 0 | 0 |
| 4-9 | do | do | 10 | 28 | 0 | 0 | 0 |
| 4-10 | do | Solvesso No. 2 | 10 | 83 | 0 | 0 | 0 |
| 4-11 | do | do | 10 | 27 | 0 | 0 | 0 |
| 4-12 | do | Xylene | 35 | 61 | 0 | 0 | 0 |
| 5-1 | Beds, chairs, walls, and ceilings of entire house. | do | 2½ | 52 | 0 | 0 | 0 |
| 5-2 | do | PD-544C | 2½ | 68 | 0 | 0 | 0 |
| 5-3 | do | Velsicol AR-50 (regular). | 2½ | 45 | 0 | 0 | 0 |
| 5-4 | do | Solvesso No. 2 | 2½ | 36 | 0 | 0 | 0 |
| 5-5 | do | Xylene | 5 | 8 | 0 | 0 | 0 |
| 5-6 | do | PD-544C | 5 | 79 | 0 | 0 | 0 |
| 5-7 | do | Velsicol AR-50 (regular). | 5 | 38 | 0 | 0 | 0 |
| 5-8 | do | do | 5 | 26 | 0 | 0 | 0 |
| 5-9 | do | do | 5 | 42 | 0 | 0 | 0 |
| 5-10 | do | Solvesso No. 2 | 5 | 30 | 0 | 0 | 0 |
| 5-11 | do | Xylene | 5 | 23 | 0 | 0 | 0 |


REFERENCES

(1) Madden, A. H.; Lindquist, A. W.; and Knipling, E. F.: DDT and other insecticides as residual-type treatments to kill bedbugs. J. Econ. Ent., 38:265-271 (1945).

(2) Madden, A. H.; Lindquist, A. W.; and Knipling, E. F.; DDT as a residual spray for the control of bedbugs. J. Econ. Ent., 37: 127-128 (1944).

(3) McGoveron, E. R.; Richardson, H. H.; and Piquett, P. G.: Toxicity of DDT to bed bugs, cockroaches, the Mexican bean beetle and housefly larvae. J. Econ. Ent. 37: 139-140 (1944).

(4) Kulash, W. M.; and Maxwell, J. M.: DDT and bedbugs in chicken houses. J. Econ. Ent., 38: 606 (1945).

(5) Report on Experimental Studies of DDT for Bedbug Eradication by United States Public Health Service Consultants Office, Federal Public Housing Authority, June 1945.



*Public Health Reports; May*, 9, 1947, *Vol.* 62, *No.* 19.


### War on Insect Foes

Richmond, Va.,—DDT is fine stuff to use against little six-legged enemies, just as TNT was fine stuff to use against bigger two-legged ones in the recent unpleasantness. But it is better if you can fix things so you will not have to use either.

Preventive entomology, which bears to other types of insect control the same relation that statecraft bears to war, was discussed here today before the joint meeting of the American Assn. of Economic Entomologists and the Entomological Society of America by Dr. P. N. Annand of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

Spread of insect enemies may be hampered, though never entirely stopped, by quarantines, both internal and foreign. Dr. Annand told his audience. Treatment by fumigation or spraying of incoming cargoes and carriers, whether by sea, land or air, is another means of maintaining the watch on the border.

Just knowing what pests are about and how active they are is often the means for heading off an outbreak. Hence an entomological G-2 is maintained whenever means permit, through extensive surveys.

Akin to these, but not yet in use, would be perodic reports on crop pests, made able quickly to farmers and foresters as weather reports are now.

### Moth-proof Wool Found On The Hoof

Moscow, Idaho—Entomologists at the University of Idaho have come up with another convenience for the modern world—moth-proof wool produced in the sheep.

The Department of Agriculture says entomologists have discovered that wool from sheep dipped in a DDT solution two years ago is still moth-proof in storage warehouses.

# What can you look for in a sprayer?

**Look for a stainless steel tank—for only stainless steel will resist corrosive insecticides. That's why we say "Once you own a Lofstrand sprayer, you'll never need another".**

SEE YOUR DEALER, OR WRITE DIRECT TO:

## The LOFSTRAND Company

ROCKVILLE, MARYLAND

*THE NAME "LOFSTRAND" STANDS FOR 16 YEARS OF PIONEERING RESEARCH AND ENGINEERING ACHIEVEMENT*

# LET'S SKIP THE SUPERLATIVES

## HERE ARE FACTS!

**PETERMAN ROACH POWDER, CONTAINING PIPERONYL CYCLOHEXENONE, IS —**

A product of laboratory research and field development.

Milled in an especially-designed production unit to give intimate blend and desired particle size.

Biologically tested prior to packaging for shipment.

Easy to use and inexpensive for spot treatments at regular intervals.

Stabilized so that killing power is not affected by prolonged storage.

Quickly effective and long-lasting.

**Especially useful where foods are manufactured, stored or served as proven by field use and independent toxicological data.***

**ECONOMICAL** **WRITE FOR PRICE LIST** **PROMPT DELIVERY**

***Dr. HEBER C. DONOHOE, Research Director, Entomologist***

## WILLIAM PETERMAN, INC.

411 WILSON AVENUE
NEWARK 5, N. J.

***Available on request.**

# The Permanence of Termite Repellents *

By GEORGE N. WOLCOTT, Agricultural Experiment Station,
University of Puerto Rico, Rio Piedras

IN ADDITION to all the desirable qualities which cabinetmakers recognize in the wood of West Indian mahogany, **Swietenia mahogoni** L., for the tropics it possesses the characteristics of being highly resistant to termite attack, and more specifically, of being practically immune to attack by the West Indian dry-wood termite, **Cryptotermes brevis** Walker. Despite the high lignin content of mahogany heartwood, twice that of most temperate zone woods, it is doubtful if this is the decisive factor in its rejection by termites as an item of food, even though lignin is entirely undigestible by them. Indeed, when mahogany heartwood is eaten, ninety per cent of the weight of the wood eaten reappears in the weight of the excrement pellets, as compared with 50 per cent thus appearing when a more acceptable and more completely digestible wood has been eaten.

East Indian teakwood, **Tectona grandis** L., has an even higher content than mahogany, and in addition contains considerable amounts of a specific chemical compound, a beta-methylanthraquinone called tectoquinone, which is definitely repellent to termites. In the extensive tests conducted with promising chemicals as repellents to the attack of the West Indian dry-wood termite, as reported in the **Caribbean Forester** for July 1943 and subsequently, tectoquinone proves to be among the most desirable, a 10-minute submersion of a very susceptible wood in a solution containing only 0.5 per cent of tectoquinone forming an effective protection against termite attack for as long as the tests have been conducted with it. Numerous other tropical woods are as unpalatable to dry-wood termites as are teakwood and mahogany, but of these woods, chemical analysis to determine the termite-resistent factor have not been made, or the constituent is not commercially available for test.

In striking contrast to the marked resistance or near immunity of many tropical woods to termite attack, all of those of the temperate zone which have been tested are susceptible or very susceptible, except two. The resistance of southern cypress, **Taxodium distichum** L., depends elmost entirely on the extent to which its heartwood is impregnated with resinous gum, and to the fineness of grain; for coarse-grained, non-gummy cypress heartwood is rapidly eaten, and the sapwood is very susceptible to attack by dry-wood termites. Osage orange, **Maclura** (or **Toxylon**) **pomiferum** Raf., is even more resistant to termite attack than mahogany and teak, but tests do not indicate that this is due to its high content of dye fustic, which is its most obvious and characteristic constituent.

The high susceptibility to attack and destruction by the West Indian dry-wood termite, **Cryptotermes brevis** Walker, of the temperate zone woods commercially used for construction, interior trim and furniture, indicates the need for artificial protection of these woods if their maximum usefulness is to be obtained in the West Indies. Admittedly, no chemical and no method of treatment can so thoroughly impregnate any of these woods that to their very center they will be the equivalent of the Osage orange, or West Indian mahogany, or Demerara greenheart, or Amazonian muirapiranga, or East Indian teak, or others of the equally valuable but less well-known tropical hardwoods. But by mere submersion in a water solution of copper sulfate or zinc chloride, one ounce of either to a gallon of water, it is possible to establish at least a thin outer layer of protection which will be effective as long as it remains entire and unbroken, or is not leached away by exposure to rainfall. Numerous termite-resistant chemicals, entirely insoluble in water, are readily dissolved in organic solvents, and in addition are more desirable because of greater ease of application and deeper penetration. Each of these chemicals must be evaluated according to its specific characteristics, and of these, possibly the most important is permanence.

Water itself, as well as the organic solvents, is temporarily repellent to dry-wood termites, but as soon as the water or other liquid evaporates from the piece of termite susceptible wood used for the test, it at once becomes as susceptible to termite attack as though it had never been submerged. Much slower to evaporate, or volitilize, but essentially not differing from water, alcohol, benzene or acetone in the way they eventually disappear from the wood sample, are ever so many other chemicals, solid as well as liquid, inorganic as well as organic. Possibly one of the most obvious is the bright red mercuric iodide, an inorganic solid, which dissolves in acetone to form a clear sparkling liquid, as transparent as acetone itself. The color of the wood sample submerged in the solution of mercuric iodide changes to a light red as soon as the acetone has evaporated, indicating that the mercuric iodide has been precipitated on the wood in a very finely divided form. The treated sample is not only repellent to termites, but so immediately toxic that those resting on it, or attempting to run over it, die before they can get beyond the influence of the chemical. A few days later, however, and one will note that the wood samples impregnated with the greater dilutions of mercuric iodide no longer show any reddish coloration, and, placed with termites for test, are not toxic or even repellent, for the termites eat with impunity. Within less than 2 months, even the samples impregnated with saturated solutions of mercuric iodide in acetone are similarly non-toxic and nonrepellent. Indeed so far as the termites are concerned, the effect of the mercuric iodide differs from that of water only in that a longer period elapses after submersion before the wood again becomes fit for them to eat.

In contrast to mercuric iodide is the action of some of the dyes normally present in some plants and woods, and synthetic dyes, some of which have been tested for their value as termite repellents. Some dyes are valueless while others, such as alizarin, may delay the action of termites for several months. In all cases, the depth of coloration of the dyed sample has not changed at all, so far as one can see, thus one must conclude that the dye has not volatilized. Yet the termites can now eat the dyed sample, which, when freshly dyed, was immune from attack. So far as the termites are concerned, it makes little difference what the nature of this change is, for, if it is not evaporation or volitilization of the chemical, the result is the same.

Admittedly, mercuric iodide is an extreme case, chosen because we can

*Paper presented on the Richmond Program, Dec. 1946.

# LOOK...SAVE

**GULF'S** entire stock of bulk and packaged Wartime Formula Gulfspray (No. 5 Gulfspray) is offered to Pest Control Operators at "distress" prices.

**FORMULA:** 3.55% Organic Thiocyanates (5½% Lethanes 60 and 384) with 0.03% Aromatics in Gulfspray odorless-type insecticide base oil. Guaranteed Grade AA Spray as is.

Add 1068 or DDT, etc., as required for your special service uses.

Available supply is large; probably sufficient for operators' full 1947 season use.

Delivery from Gulf warehouses in Texas, Arkansas, Tennessee, Kentucky, Indiana, Michigan, and all states East.

## YOUR PRICE

| | |
|---|---|
| 24/1-pint cans or bottles | $1.20 per case* |
| 12/1-quart bottles | 1.00 per case* |
| 24/1-quart cans | 2.00 per case* |
| 6/1-gallon cans | 1.84 per case* |
| 11/5-gallon pails | 1.25 each** |
| 55-gallon drums ($4.00 drum deposit) | .25 per gal.** |
| Tank Cars (F.O.B. Port Arthur, Texas; ½ freight allowed) | .18 per gal. |

*Where merchandise is not available locally, Gulf will pay ½ the freight from shipping point.

**Delivered in above outlined territory, also the states of Illinois, Wisconsin, Minnesota, Oklahoma and Missouri.

As this merchandise is offered "for use," not resale as Gulfspray, labels will be removed from bottles. Title panels of cans and pails will be "painted out."

WRITE

## GULF OIL CORPORATION

SPECIALTY SALES DEPT. GULF BUILDING PITTSBURGH 30, PA.

see that volatilization has occurred, but experience tends to indicate that it is typical of numerous other compounds. Initially, the copper pyro and ortho phosphates (Monsanto) are 10 times as repellent to dry-wood termites as is copper sulfate, but within a year after treatment, **Cryptotermes** are able to eat the wood samples treated with 0.2 per cent of copper as copper pyro and ortho phosphate, although the 0.15 per cent of copper as copper sulfate-treated sample is still as repellent as when first prepared, 4 years ago. Indeed, even the organic triphenyl phosphate (see table 1) shows greater permanence.

One-tenth as much of the fluoride of copper, is as repellent as of the sulfate of copper, and, of the fluoride of zinc, one-tenth is as repellent as of the chloride of zinc. For the period during which these fluorides have been available for test (over a year and a half), the reaction of the termites to the wood samples impregnated with them has suffered no change, and one may assume that their effect is permanent. Indeed, on the basis of effectiveness in protecting wood against termite attack, the fluorides of copper and zinc might replace the standard chemicals. Their most obvious disadvantage (or advantage) is that they are not soluble in cold water, and not too readily soluble even in boiling water.

The silicofluorides of zinc (Harshaw) and copper, really soluble in cold water, and the fluoborates, supplied in solution by the manufacturer (General Chemical) are at first as repellent as the fluorides, but in the course of several months' exposure in the air of the treated samples, only the zinc silicofluoride proved to be more, and the others even less so than the sulfate and the chloride.

The fluorides of cadmium and antimony are soluble in water, and the fluorides of mercury and lead in dilute nitric acid. Initially, they are more repellent to termites than any other compounds of these metals, and even the greatest dilution of cadmium fluoride tested was initially very toxic. Within a few weeks, however, the impregnations with mercuric fluoride no longer protected against termite attack; within a few months the concentrations of antimony are less effective than those of antimony trichloride, and the parallel concentration of lead fluoride is eaten; within half a year the termites are able to eat wood impregnated with stronger concentrations of cadmium fluoride than those with less cadmium as cadmium acetate and bromide.

Because some inorganic chemicals, as illustrated, become somewhat to very much less repellent to termite attack with the passage of time, it is necessary to test all of them repeatedly, to make sure that the results are as permanent as they seem at first. Regarding the organic compounds one soon comes to consider all results as temporary, and subject to change and correction as the period of the test is lengthened.

The chlorination or bromination of phenol, producing such effective treatments for the preservation of wood as pentachlorophenol, pentabromophenol and hexachlorpohenol (Dow), is not a unique success, for the chlorinated terpenes (Hercules Powder) are initially very toxic to termites at great dilutions. Although these treated samples may be eaten after 5 months, the wood with the greater concentrations is still toxic for another 5 months. Thus, despite their initial effectiveness, one can but hesitate in making any prediction as to the permanence of the chlorinated terpenes, for the various kinds and fractions of pine oil from which they are presumably derived have a very temporary effect in delaying termite attack. Chlorination of the resinous gum of cypress, or of oil of cedar, gives greater promise of permanence. Neither heavily chlorinated fractions of cashew nut shell oil, nor the unchlorinated crude, show a permanent value in repelling termites, but the chlorinated crude cardol (General Foods) continues to be effective for a year at a concentration of 5 per cent, and the chlorinated crude anacardic acid for even longer.

Theoretically, combinations of the repellent metals with toxic or repellent organic compounds should give maximum results, comparable to zinc and copper fluoride being more effective than zinc chloride and copper sulfate. The commercially available naphthenates of such metals (**Nuodex**), usually dark in color, sticky and evil-smelling in all cases, appear to us as being the sort of thing that should be repellent to termites, as they are offensive to us. Tests show, however, that surprisingly high concentrations are ineffective, treatments containing 12 per cent being required to protect wood samples for 2 years.

Much pleasanter to handle are the metallic salts of pentachlorophenol, impregnations with 0.2 per cent having proved repellent for as long as they have been available for test. Sodium pentachlorophenate (Monsanto), water-soluble and readily obtained, surprisingly enough appears to be almost, if not quite, as effective as the pentachlorophenates of copper (Monsanto) zinc (Dow) and lead.

Ferric iron is a less powerfully repellent metal, and duPont's **Fermate**, a ferric dimethyl-dithiocarbamate, although somewhat toxic to termites at first, eventually fails to protect wood from their attack at concentrations of less than 0.5 per cent. Comparable combinations with copper and zinc are initially very toxic, so much so indeed that tests merely repelling termites can not be conducted. A year later, however, the wood samples are no longer violently toxic, and 4 months later at 0.1 per cent, neither chemical prevents the wood being eaten. The chloride and the stearate of pyridyl-mercury (Mallinckrodt) have proved to be equally repellent to termites during the short time they have been available for test, and somewhat more so than diphenyl mercury and phenylmercuric chloride, but the cost of all mercury compounds is so high by comparison with that of copper and zinc that it is doubtful if any of these will be commercially used for treating wood.

The graphs of resistance to termite attack displayed by the various organic chemicals at different concentrations do not show a uniform pattern. Thus, from past experience or similarity to other chemicals, one can not predict as to projections into the future. Of those of little or no value, such as the yellow dye sodium fluorescein, the lowest concentration tested is attacked on the day after the wood sample was impregnated, and each doubly greater concentration is eaten on the following day. More promising, but eventually disappointing are those in which, although two or three of the lower concentrations show a somewhat similar pattern, attack may be delayed for weeks or months on the next greater concentration, as in the case of alizarin, and the graph on another plateau. But eventually the termites attack all the greater concentrations prepared for test.

Regardless of their start, the graphs of all the apparently valuable organic compounds eventually terminate in the infinity of a treated sample uneaten after a long period of exposure to termite attack. Most striking are pentabromophenol and DDT. Of the latter, 1 per cent protected treated wood for little more than a month, yet 2 per cent DDT is uneaten over 30 months later. Two weeks only did 0.5 per cent pentabromophenol protect treated wood, yet the sample impregnated with 1 per cent pentabromophenol is still uneaten by termites 2 years later. But

## *It Pays* TO USE ELKAY

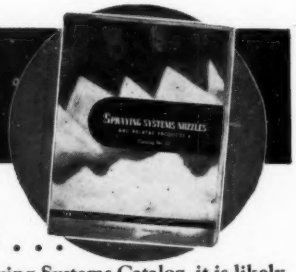
- **SHUR-KATCH** Mice and Rat Pads
  Catches Rodents Like Flypaper Catches Flies
  NO POISON—NO BAIT
- **DDT. Concentrates**
  Specially compounded for household and agricultural insecticides
- **Refined NAPHTHALENE**
  Flakes and Balls—Packages and Barrels
- **WIZO Deodorizing Blocks**
- **WIZO Deodorizing Crystals**
- **WIZO Moth Products**
  Vaporizers — Crystals — Cakes

*Write for Details and Prices NOW!*

**ELKAY PRODUCTS CO.**
323-27 West 16th St. New York 11, N. Y.

---

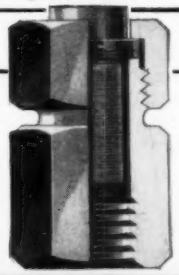
**For All the Facts on SPRAY NOZZLES...**



Until you have seen this Spraying Systems Catalog, it is likely you have never had all the facts on the thousands of spray nozzles available to you. Consistently changeover to Spraying Systems Spray Nozzles has resulted in greater spraying efficiency and lower costs. In part this is due to advanced hydraulic design . . . but in big part it is due to no other reason than that Spraying Systems Spray Nozzles number in the thousands of types and sizes . . . a group so great, that for any given application, there is a spray nozzle to fit your application exactly. Prove this to yourself . . . write for Catalog No. 22

**SPRAYING SYSTEMS CO.**
4093 West Lake Street • Chicago 24, Illinois

**To IMPROVE RESIDUAL SPRAYING**



Maximum effectiveness of insecticides such as DDT depends solely on proper residual spraying. Here is the nozzle that gives you an exact and uniform distribution of the spray . . . free of streaks. An approved design available in ¼ T-8001, ¼ T-8002 and all other standard capacities.

**SPECIALISTS IN SPRAY NOZZLE DESIGN AND MANUFACTURE**

---

## M·S·A: PROTECTION HEADQUARTERS *for the* PEST CONTROL OPERATOR!

M.S.A. supplies the safety equipment you need for dependable protection in pest control on the job . . . developed by intensive research and quality—built by the world's largest manufacturer of approved safety products. You're sure of safe performance and top wearing comfort when you specify M.S.A.—all the way!

**M·S·A CHEMOX* OXYGEN BREATHING APPARATUS**
Self-generates oxygen as you breathe, using replaceable canister! Respiratory safety in *any* gaseous or oxygen-deficient atmosphere.

**M·S·A DDT RESPIRATOR**
Replaceable twin chemical cartridges prevent inhalation of DDT and DDT solvents or carriers. Easy-fitting facepiece.

**M·S·A HCN GAS MASK**
Protects against HCN concentrations wherever enough air is present to support life. Long-lasting, replaceable canisters.

**M·S·A DUST RESPIRATOR**
Popular M.S.A. Comfo and Dustfoe models provide ALL-DUST breathing protection, with inexpensive throwaway filters.

**M·S·A GAS TIGHT GOGGLES**
Keep gases, mists and irritating dusts out of eyes. Non-fogging water chamber design.

**M·S·A FEND HAND CREAMS**
When rubbed on the skin, provide protective barrier against irritants. Easily washed off after work.

**M·S·A FIRST AID KITS**
Unit-packaged first aid treatments, ready for instant use. Dust and moisture-proof steel cases.

**Write for descriptive Bulletins on these outstanding M·S·A Products!**

* Trademark Registered

**MINE SAFETY APPLIANCES CO.**
BRADDOCK, THOMAS AND MEADE STREETS
PITTSBURGH 8, PENNSYLVANIA
*District Representatives in Principal Cities*

with 0.1 per cent copper and zinc dimethyldithiocarbamate eaten after 529 and 530 days, 2 per cent **Thanite** after 412 days and 1 per cent pentachlorophenol after 337 days, it becomes obvious that the period of test must be for years, to be at all conclusive. No way of speeding up mere exposure seems practical, yet it is impossible to continue tests indefinitely in time, to prove that somewhat or considerably greater concentrations will continue to be effective for 10 years, 20 years, or permanently. Actual commercial applications can not wait that long.

The results obtained experimentally, using the most susceptible woods for test samples, are, however, hardly more than an indication of what may be expected in practice with less susceptible commercial woods, for their natural resistance may be a rather considerable factor to be added to that of the chemical. At the start of the investigations, the wood of the almacigo or West Indian Birch, **Bursera simaruba** L., was used because it was known to be very susceptible to termite attack, and a supply happened to be available for use. Later, when all the very susceptible woods were re-tested to determine which were the most susceptible, it was found that of those readily available in Puerto Rico, the flamboyan or royal poinciana, **Delonix regia** Boj., was considerably more susceptible to dry-wood termite attack than was almacigo. The difference was not great, for both were close to the bottom of the list, and it may seem a small point to emphasize, but the comparative tests with alizarin (see table 1) show how important it may be.

The wood of neither almacigo nor flamboyan has any commercial value, but they were invaluable when used for testing chemicals because the results as obtained show largely the value of the chemical, with a minimum of resistance due to the wood used. For commercial woods, the value of the chemical will be somewhat to considerably increased by whatever greater natural resistance these woods possess, even if it is not much by comparison with mahogany. At least one can be certain that any treatment, using any of these more desirable chemicals, is infinitely better than if no attempt at protection had been made. One may reasonably hope and expect that impregnations of from two to five times as much as have given protection to such very susceptible woods as almacigo and flamboyan for a year or longer, should be effective on commercial woods for a considerable period of years. Definite proof of performance, however, we can not obtain, and its too confident prediction is only wishful anticipation.

**Summary**—Of fluoride of copper, when used to impregnate termite-susceptible wood, one-tenth as much is as permanently repellent to the "polilla" or West Indian dry-wood termite, **Cryptotermes brevis** Walker, as of copper sulfate; of fluoride of zinc, one-tenth as much is as repellent as of zinc chloride. The silicofluorides of zinc and copper, their fluoborates, and the fluorides of cadmium lead, antimony and mercury, although initially as effective, and in some cases very toxic, eventually cease to be either repellent or toxic. The loss of this property of being repellent to termite attack applies to some inorganic chemicals impregnating wood at great dilutions, but was found to be universal among the organic compounds tested.

Wood dyed lavender with 0.05 per cent alizarin was thus protected from termite attack for over 3 months, but that dyed deeply purple with 1 per cent alizarin was eaten in less than 5 months. Diphenyl mercury and phenylmercuric chloride at 0.1 per cent made wood resistant for over 3 months but impregnations with twice or five times as much protected the treated wood for only a few days longer. Oher chemicals show very different reactions to the termites. Wood submerged in a 1 per cent solution of DDT in benzol was attacked by termites in little more than a month's exposure to the air, but 2 per cent DDT has protected for nearly 3 years. Two weeks only did 0.5 per cent pentabromophenol protect, yet the sample impregnated with 1 per cent pentabromophenol is still uneaten by termites 2 years later. Tectoquinone at 0.2 per cent was effective for a month and a half, and 0.2 per cent xanthone for 2 months, but the wood samples submerged in 0.5 per cent of these chemicals have not been eaten in over a year. Dilutions of 0.1 per cent of the lead and sodium pentachlorphenates, and pyridimercuric chloride and stearate, are eaten in less than a month, but 0.2 per cent of these chemicals has not been eaten in a year or longer.

As all tests were made on woods very susceptible to termite attack, the natural resistance of commercial woods, reinforced by that of the more effective organic compounds in large amounts, should result in at least commercially permanent immunity. —12-11-46.

### LITERATURE CITED

Wolcott, G. N. 1943, 44, 45. How to make wood unpalatable to the West Indian Dry-Wood Termite, **Cryptotermes brevis** Walker... Carribean Forester, 4(4): 145-56; 5(4): 171-80; 6 (4): 245-66.

Wolcott, G. N. 1946. Factors in the Natural Resistance of Woods to Termite Attack. Caribbean Forester, 7(2): 121-34 and (in Spanish) 139-49.

Wolcott, G. N. 1946. A list of woods arranged according to their resistance to the attack of the West Indian dry-wood termite, **Cryptotermes brevis** Walker. Caribbean Forester, 7(4): 329-36.

*Jour. Econ. Ent., Feb.* 1947, *Vol.* 40. *No.* 1.

## Baltimore's Rat Population About Same As 5 Years Ago

Baltimore probably has as many rats today as it had five years ago.

No Pied Piper — not even the city's rodent-control program—has driven out in any appreciable number Baltimore's horde of rats, once set at one for each member of the human population.

These are the beliefs of Dr. Wilmer H. Schulze, of the Health Department, now head of the Baltimore City Rodent Control Coordinating Committee.

**Rat Population About Same**

While there has been no recent census of the city's rats, according to Dr. Schulze, apart from peaks and valleys in the curve of rat residents, it is unlikely the ranks have been measurably thinned.

"You can't just call up the City Hall and say I have rats and expect to get rid of them," Dr. Schulze said.

"You've got to do something about it yourself."

Doing something about it, Dr. Schulze maintains, means the destruction of dilapidated sheds, the filling of holes, the razing of wooden fences and back-yard toilets, all part of the rodent habitat.

It means "starvation" of the rats through removal of food scources, principally garbage, and the barring of entrance to other foods.

"All the poison won't kill off the rats without rat-proofing, and destruction of habitat and food scources," Dr. Schulze said.

**Experiment in One Area**

He related an experiment conducted in the South Baltimore area bounded by Hamburg, Henrietta, Bevan and Leadenhall streets.

There, for a year and a half, the rodent-control authorities enforced housing and building laws, destroying centers in which rats lurked, and, at the same time, applying the poison, Antu.

Begun in late 1945, the campaign continued in a heavily infested area until the middle of 1946, when, physicians were satisfied, the neighborhood was rid of rats.

**Residents Co-Operate**

"It was only accomplished through cooperation of the residents," Dr. Schulze declared.

"In the war on rats," he said, "neighborhoods should set up committees, headed by block captains, and work as volunteers with rodent-control authorities.

**(We would like to think that included with such program would be that of working co-operatively with pest control establishments that are qualified to do such work. Ed.)**

Unless you destroy the last two rats," Dr. Schulze said, "within a year's time, the rat population can re-establish itself in any neighborhood."

— *From Baltimore Sun*

*Reliable* • • • • *Non-poisonous* • • • • *Efficient*

# SPECIAL PYRETHRUM POWDER

## *for the* SAFE, SURE EXTERMINATION *of*

## *Household Pests*

• Non-poisonous to humans but sure, quick death to roaches, fleas, silver fish and other household and industrial pests. Special Pyrethrum Powder does a sure job of extermination with complete safety, eliminating all danger to humans and household pets.

Economical to use, it permits a good profit while doing a first-class job. Preferred for many years by most exterminators. Write for full information and prices today.

*Also manufacturers of the Pyrethrum and DDT Concentrates — "Pyrocides"* and "Multicides"**

*Better Insecticides*

*TRADE MARKS REGISTERED U. S. PAT. OFF.

**McLAUGHLIN GORMLEY KING CO.**

MAKERS OF INSECTICIDES — FOUNDED 1902

MINNEAPOLIS, MINNESOTA

**TERRA TOX**

## for Five-Point Positive TERMITE CONTROL

- PENTACHLOROPHENOL BASE — for maximum effectiveness. One of the most potent chemicals for use against termites, as proven by tests of U. S. Department of Agriculture.
- HIGHLY CONCENTRATED—to save shipping costs and storage space.
- EITHER WATER OR OIL SOLUTION—to best suit your requirements.
- FOR LARGE OR SMALL JOBS — available in 1 and 5 gallon cans—30 and 55 gallon drums.
- THE RIGHT SOLUTION—for subterranean termites, TERRATOX Nos. 225, 235 and 245 are especially recommended for soil and Wood treatment. For control of Drywood Termites, TERRATOX No. 215 is highly effective.

**OPERATORS!**

Send today for TERRATOX Bulletin with application information of value to all termite control operators.

**WOOD TREATING Chemicals Co.**

5137 Southwest Ave.
St. Louis 10, Mo.

# Panama Test House Immune to Termite Attack After 21 Years

By DR. THOS. E. SNYDER, Senior Entomologist, Forest Insect Investigations.

*Inspection Made in February 1947 Shows Wood Treated with Either Zinc Chloride or Creosote Has not Been Attacked by Termites, Although Located in a region of Heavy Infestation.*

TO THOSE familiar with the damage frequently wrought by termites to untreated wood structures in areas infested with them, the resistance to their attack shown by the test house built in the Canal Zone is one of the most impressive examples known of the efficiency of preservative treatment in protecting wood from destructive insects.

For many years the U. S. Bureau of Entomology, now known as the Bureau of Entomology and Plant Quarantine, has studied termites and has accumulated valuable data pertaining to the best methods of combating them. As far back as 1912 the Bureau started experimental work to determine the effectiveness of chemical preservatives in protecting wood from their attack. At that time wooden stakes treated with various amounts of several preservatives were set at Falls Church, Va., in soils heavily infested with termites. The tests proved that coal-tar creosote was the best protection against termites for wood set in the ground, and results were sufficiently promising to warrant more extensive experimentation. In 1926, therefore, this test house was erected by the U. S. Bureau of Entomology in cooperation with the American Wood-Preservers' Association. The site selected was Barro Colorado Island, Canal Zone, Panama, a tropical jungle where 30 species of wood-destroying termites were known to occur. It has since been determined that at least 45 species can be found there.

The structure is 16 ft. square and 10 ft. high, set on wooden posts extending 3 ft. in the ground. It is built entirely of southern pine and has two windows on each of two sides. The posts and the framework resting on them were pressure treated with coal-tar creosote. The sills, floor joists, and sub-flooring were given 12 lbs. per cubic foot; and the studding, headers, plates, ceiling joists, and rafters 8 lbs. per cubic foot. The shingles were stained with creosote.

The top flooring, novelty siding, shingle strips, window frames and sash, including inside casing, door frame and door complete, including inside casing, and baseboard corner boards were treated with ½ lb. of dry zinc chloride per cubic foot. The wallboard was treated with chlorinated naphthalene. This wallboard was partly attacked by stingless bees and termites, and in 1935 it was removed and replaced by wood treated with 0.42 to 2.23 lbs. of chromated zinc chloride per cubic foot.

Inspections of this building have been made at frequent intervals since its erection and the results have been reported in various issues of the **Wood Preserving News.** The last report published was in the July 1941 issue, Covering the August 1940 inspection, at which time there were no signs of damage by either termites or decay in any of the treated woodwork. The latest inspection was made in February of this year by the writer in company with James Zetek, also of the Bureau of Entomology and Plant Quarantine, and the entire building was found in excellent conditions with the exception of the exposed steps, some of which were decayed and will require replacement. Before continuing with the details of this examination it might be well to review briefly the findings of previous inspections and to present here a chronological picture of the behavior of the treated wood in this building under perhaps the most severe conditions to which it could be subjected.

When first inspected, in January 1928, there was no termite or decay attack, but an abandoned shelter tube built by a subterranean termite (**Nasutitermes corniger** Motsch.) was found on one creosoted support. The shingle roof, which climatic conditions had caused to open up and permit entrance of rain, was covered over with corrugated asbestos roofing.

The second inspection, made in July 1928, showed a tunnel of the same termite heavily occupied by workers and soldiers, and a second abandoned shelter tube, but there was no damage to the wood.

At the next three inspections, in 1929, 1930 and 1932, abandoned tunnels were found on practically all wooden supports but, again, there was no injury to the wood.

When next inspected, in March, 1935, termites had made their way through shelter tubes built over the treated wood until they had reached the fiber board ceiling which had been treated with chlorinated naphthalene. Live termites of the species found on the first inspection were found in this material, but they had not entered the treated wood. In June of the same year live termites were found at the junction of the south wall and the ceiling, and others were in tunnels on the southwest post, but they had not penetrated the treated wood.

By November 1935 another insect had made its appearance. A rather large nest of a stingless bee (**Trigona** sp.) was discovered. The bees were very active and had eaten the fiber board and wallboard. There was no damage to the treated wood and all termite tunnels were vacated. A very thick shelter tube made by the subterranean termite (**Copotermes niger** Snyder) containing live termites was found on one post and a nest of the same species on the ground.

In September 1937 a very wide inhabited tunnel made by **Nasutitermes corniger** Motsch, was found, and the wallboard was definitely damaged. At this time it was removed and new wallboard and round moulding, both treated with chromated zinc chloride, were placed.

When inspected in February of this year the general appearance of the building was excellent. The only deterioration which had occurred was in the steps which. as noted above, had decayed sufficiently to necessitate some replacement. The posts at front right and rear right had termite tubes built clear to the roof. At ground level they were occupied by live **Nasutitermes corniger,** but near the roof they were occupied by an ant (**Azteca** sp.) which had evidently killed the termites and taken over the tubes. The other seven posts also had termite tubes but no live termites. On the outside, on several siding boards were some **Nasutitermes** tubes, but no live termites. No damage to treated wood was noted anywhere. Inside, the wallboard and strips, treated with chromated zinc chloride, and the table, chairs and floor, treated with straight zinc chloride, were in very good condition.

# SCARAT
## FOR RATS

*Its ODOR Terrifies!*
*Its TASTE Disgusts!*
*Its EATING "Kills"!*

* * * * *

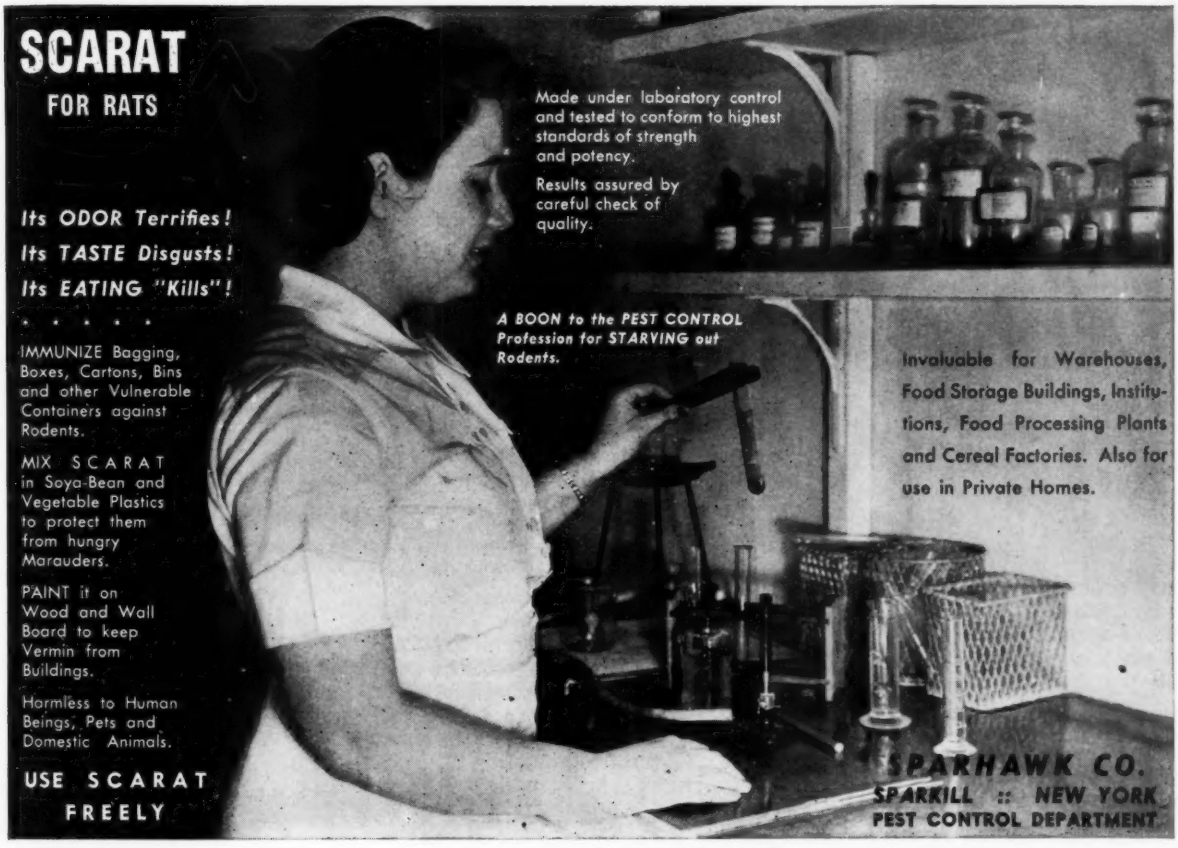
IMMUNIZE Bagging, Boxes, Cartons, Bins and other Vulnerable Containers against Rodents.

MIX SCARAT in Soya-Bean and Vegetable Plastics to protect them from hungry Marauders.

PAINT it on Wood and Wall Board to keep Vermin from Buildings.

Harmless to Human Beings, Pets and Domestic Animals.

**USE SCARAT FREELY**



Made under laboratory control and tested to conform to highest standards of strength and potency.

Results assured by careful check of quality.

*A BOON to the PEST CONTROL Profession for STARVING out Rodents.*

Invaluable for Warehouses, Food Storage Buildings, Institutions, Food Processing Plants and Cereal Factories. Also for use in Private Homes.

**SPARHAWK CO.**
SPARKILL :: NEW YORK
PEST CONTROL DEPARTMENT

FLIES • MOSQUITOES • BEDBUGS • COCKROACHES • FLEAS

# *Get Results* — use NEOCID DDT COMPOSITIONS

Geigy—*"Originators of DDT Insecticides"*—offers you two NEOCID* DDT Compositions that are highly effective in pest control.

**NEOCID A 10**—a finely-ground artificially-colored powder containing 10% Geigy DDT.

**NEOCID D 30**—a solution containing 30% Geigy DDT (by weight) for dilution with deodorized kerosene.

If your local dealer doesn't have these tried-and-proven Geigy formulations, just send us his name and address.

*Reg. U.S. Pat. Off.

Geigy

## GEIGY COMPANY, INC.

89 BARCLAY STREET, NEW YORK 8, N. Y.

ORIGINATORS OF DDT INSECTICIDES

A very large number of nests of a leaf-cutting bee **Euglossa (Eulaema) dimidiata** Fab., were also found "plastered" on the sills under the house and the floor joists where they rest on the sills. No adults were seen, but several nests were taken for identification. No damage was noted. On the north side, on the roof, a rather large aroid plant was growing.

An idea of what would undoubtedly have happened to the wood in this test house if it had not been given good preservative treatment is gained from knowledge of what did happen to unprotected materials inside the house. Untreated wood in an army cot placed in the house for use during early inspections had been reached by the termites by way of shelter tubes built over the treated wood. The termites were in the wood of the cot, and in the mattress and the pillows. Breakfast food containers, paper, pencils, frames of mirrors and, in fact, any wood material not treated was attacked by them. The frequent presence of unoccupied shelter tubes was mute evidence of the effectiveness of the preservatives in preventing entrance of the termites into the treated wood. Their failure to find edible wood at the end of the trail caused them to abandon the effort.

*Reprinted from Wood Preserving News, May*, 1947.

### Spider Hunt Is Productive

Spider hunting is a thrilling business to Brian John Marples, professor of zoology at the University of Otago, New Zealand, who has returned following a three-month visit to Upolu in Western Samoa. His exciting find was a rare type of miniature whip scorpion, whose structure must be studied under a microscope. Another was a variety of the springtrapper spider, which builds its web with a thread attached to the central point, using it to draw the web into the shape of a cone. When an insect enters the cone and touches the web the spider, from its place of concealment, according to naturalists, releases the thread and the web springs forward, enmeshing the prey. Marples also obtained a hairy arachnid several inches across, caught for him by friends.

### U. S. Almost Lost a President

The United States almost lost a President because of a freak cross-connection. Just before his inauguration, James Buchanan stayed at the National House Hotel in Washington. To prevent rats from annoying this famous guest, arsenic poison was placed in strategic spots.

The rats, on eating the arsenic, rushed for the water tank on the roof of the hotel. Some managed to get into it, contaminating the water. Many guests became severely ill and one man died. Fortunately, President-Elect Buchanan was only slightly affected and recovered in a few days in time to attend his inauguration ceremonies.

## United States Department of Agriculture
## Agricultural Research Administration
## Bureau of Entomology and Plant Quarantine

*The following information on the toxicity of Hexaethyl Tetraphosphate is released for your information by the Interdepartmental Committee on Pest Control.*

*S. A. Bower, Chairman*
*Interdepartmental Committee on Pest Control.*

### Warning On Use Of Hexaethyl Tetraphosphate

At the request of the Interdepartmental Committee on Pest Control, a subcommittee, consisting of Dr. Paul A. Neal (Chairman), Chief, Industrial Hygiene Research Laboratory, National Institute of Health; Dr. A. J. Lehman, Chief, Division of Pharamacology, Food and Drug Administration; and Dr. L. E. Chadwick, Chief, Entomology Section, Medical Divison, Army Chemical Center, Edgewood Arsenal, Maryland; was requested to review available information on the toxicity of Hexaethyl Tetraphosphate and make any comments as to use that they might feel would be appropriate. Their report, which is released for your information follows.

The results of animal toxicological research to date and reports of untoward effects on humans exposed to hexaethyl tetraphosphate in its application as an insecticide warrant the following precautionary statements on the toxicity and potential danger of hexaethyl tetraphosphate:

The minimum lethal dose of hexaethyl tetraphosphate by oral ingestion is as low as 5 milligrams per kilo in some species of animals. The compound is readily absorbed by the intact skin. The fatal dose of hexaethyl tetraphosphate by absorption through the skin for the rabbit is 5-10 milligrams per kilo; however, symptoms of ststemic poisoning are noted at dose levels as low as 1 milligram per kilo. These effects progress from gastro-intestinal tract upset, anorexia and severe diarrhea to a characteristic "head-drop," a great weakness and apathy, depending on the severity of the poisoning. Therefore, hexaethyl tetraphosphate is an exceptionally toxic material, especially with regard to its absorption through the skin. It has been found that the principal mode of action of hexaethyl tetraphosphate is by its destruction of cholinesterase. Symptoms complained of in humans exposed to hexaethyl tetraphosphate in spraying operations are a marked shortness of breath with a sense of constriction in the chest. Such symptoms may be expected from an anti-cholinesterase substance.

These preliminary findings demand that human beings not be exposed to hexaethyl tetraphosphate either by ingestion, skin contact or inhalation.

Since the toxicity of hexaethyl tetraphosphate for humans and warm-blooded animals is not fully known, although it has been established that it is a very toxic and dangerous material, the following precautions are recommended:

1 Avoid contact with the skin, especially when handling the concentrated material. Gloves impervious to hexaethyl tetraphosphate should be worn. If skin is accidentally contaminated, wash carefully with soap and water immediately. Individuals should be required to keep shirts buttoned at the neck, sleeves down and buttoned at the wrist.

2 Avoid the inhalation of hexaethyl tetraphosphate mist, dust or aerosol by wearing a respirator or mask approved by the United States Bureau of Mines.

3 Adequate personal hygiene and cleanliness of the operation is necessary. At the end of the operation the clothing should be removed, followed by a thorough bath with warm water and soap.

4 Avoid contamination of food; smoking, eating and chewing tobacco should be prohibited in the operating areas.

5 Any persons developing symptoms of headache or tightness of the chest when using hexaethyl tetraphosphate should be removed from the exposure. In the case of ingestion of hexaethyl tetraphosphate an emetic, such as mustard or warm soapy water, should be used immediately and the patient referred to a physician.

6. A dye should be added to hexaethyl tetraphosphate in such a concentration that it will be readily detectable in the final insecticide solution.

### Scientist Makes Bug Hunting Pay

Rensselaer, Ind.—Photographic equipment is expensive, but the Rev. John Baechle, assistant professor of biology at St. Joseph's College, pays for his hobby with bugs.

While searching for photographic subjects the priest-scientist keeps one eye out for biological specimens to sell to supply houses.

If he collects 200 chicken lice and 300 sow bugs it means he'll get more film and flash bulbs—almost $10 worth.

## Spread and Power

Effective pest control requires wide spread of insecticide and the driving power to force it into every crack and crevice—under mouldings, behind baseboards, around plumbing, between cases and bales.

MISTMASTER Ball Bearing Fan Type Sprayers have both the spread and the power to do a quick, thorough job. Driven by 1/3, 3/5, or 1 hp. motors, they spray insecticides for distances as far as 40 feet, penetrate into hard-to-reach places, and spray large areas quickly, completely.

Here is a sprayer that has more power than any other portable sprayer, yet is convenient and easy to handle. Equipped with 1-gallon non-corrosive tank, driven under low pressure with a high volume of air, it can be used with any type of insecticide, either oil base or water base, and carries insecticides into remote openings in full volume and power.

Used anywhere, it plugs into any electric outlet, and is supplied with three nozzles for fine, medium, or coarse spray, can also be furnished with 2-gallon tank and special nozzles or in special design to meet individual requirements.

WRITE TODAY for further details and complete specifications, or mail the coupon.

SPRAYER CORPORATION OF AMERICA
1700 Payne Street, Evanston, Illinois

☐ Send complete information on MISTMASTER Ball Bearing Fan Type Electric Sprayers.

☐ We are interested in details of your dealer franchise.

Name.....

Address.....

City.....Zone.....State.....

Sprayer CORPORATION of AMERICA

1700 PAYNE STREET, EVANSTON, ILL.

# You can depend on

DDT products of R & H for the PCO

Besides the finest grade of DDT itself, we are now supplying Pest Control Operators with the following dependable DDT products:

**25% DDT Emulsion Concentrate.** For "residual action" insecticides, wherever a water-type spray can be used, to control fleas, bedbugs, flies, mosquitoes, silverfish and other pests.

**D-50 Dust.** A convenient source of DDT for insecticide powders to control roaches, bedbugs, ants, fleas and lice.

**D-30 Solution.** Provides DDT in oil-base sprays of both "space" and "residual action" types.

**D-50 Wettable Powder.** A water-dispersible DDT powder for use in water-base "residual action" insecticides for factories, mills, storehouses.

There is no question about quality when you rely for sources of DDT on these products of Rohm & Haas, pioneers and leaders in the manufacture of dependable chemicals for the control of insect pests. Now is a good time to order.

USE LETHANE TO ADD "FAST ACTION" TO ANY DDT PRODUCT

*Lethane is a trade-mark, Reg. U. S. Pat. Off.*

ROHM & HAAS COMPANY
WASHINGTON SQUARE, PHILADELPHIA 5, PA.

BRANCH OFFICES: CHICAGO • KANSAS CITY, MISSOURI
OAKLAND & SOUTH GATE, CALIFORNIA

CANADIAN DISTRIBUTORS: P. W. SUDEN & CO., LTD., MONTREAL & TORONTO

# Report Tells of Advances Made in Insect Control Methods

New insecticides and new ways of applying them, as well as improvements in insecticide distributing equipment, received major research emphasis during 1946 according to Dr. P. N. Annand, chief, Bureau of Entomology and Plant Quarantine, in his annual report to the administrator, Agricultural Research Administration, U. S. Department of Agriculture. The report shows that Bureau scientists conducted extensive experiments to determine future usefulness of new insecticides, that new equipment for applying them was designed, constructed, and tested, and that new methods for controlling insects were planned. Several excerpts from Dr. Annand's report follows:

### Ticks

DDT is proving effective against some species of ticks. Good control of the lone star tick was obtained on Bull's Island, S. C., when dusts or sprays were applied from ground and aircraft. These tests were made in cooperation with the Fish and Wildlife Service, which has reported that no injurious effects on wildlife have been observed.

A field test in Wilmington, Del., showed the benefits of treating dumps with 5-per cent DDT sprays for controlling houseflies.

### Clothes Moths

Since 1942 this Bureau has been cooperating with the Defense Supplies Corporation of the Reconstruction Finance Corporation to prevent undue moth injury in millions of dollars' worth of foreign wool stored in the United States under Government supervision. This wool came to the United States in compressed bales weighing from 300 to 1200 pounds and was stored from 2 to 5 bales high in large warehouses. During the past year over 500,000 bales were sprayed with DDT. Because of the manner in which the bales were stored, not more than 6 to 10 per cent of the total bale surface was treated. DDT was applied by means of 5-gallon pressure hand sprayers at the rate of about 1 gallon of 1-per cent and 0.25 per cent DDT, both as oil solutions and as water-dispersible sprays, to about 10 square feet of surface. As the season progressed there seemed to be little choice between the oil solution and the water-dispersible preparation, but the 0.25-per cent DDT was not so satisfactory as the stronger spray. The treatments were completed early in the summer. From then until fall exceedingly few living adult moths could be found, but many thousands of dead moths were on the floor surrounding the bales. Although more work should be done, particularly with American-bagged wool, before sprays can be fully evaluated, the results have been so convincing that some wool merchants are already using them as a routine control measure.

Mothproofing treatments of animal fibers are usually applied after they have been manufactured into fabrics. This leaves them without protection from the time they are sheared until they are consumed in the weaving process. This period of storage often lasts several years, during which time serious damage can take place. It does not seem practical to treat fleeces after they are removed from the animal and before they are placed in storage. From preliminary tests it appears that fleeces from animals dipped in DDT preparations for louse and tick control and sheared a few days later are rendered mothproof. In Many 1946 fleeces from animals dipped in solutions containing DDT were still as moth resistant as when they were first tested after shearing in 1944. This method of protecting mohair during the usual period of warehousing offers a new and practical solution to the problem.

### Cockroaches

In a cooperative experiment with the United States Army it was shown that a 5-per cent solution of DDT in deodorized kerosene could be used to eradicate a heavy infestation of German cockroaches. The experiment was conducted in a large hospital where the kitchens, food-preparation rooms, and other quarters were treated.

### Chemical Investigations on DDT

Many problems connected with the insecticidal use of DDT were investigated. Study of the solubility of DDT in kerosene from different sources showed naphthenic-base kerosenes to be better solvents than those of paraffinic base. Chemical investigation of the effect of ultraviolet light and sunlight on DDT indicated that technical and pure DDT, either undiluted or mixed with various inert powders, undergo very little decomposition. When DDT dissolved in an organic solvent is irradiated, however, the decomposition is greater, the degree depending upon the solvent used. A number of DDT emulsions were investigated as to stability and plant injury. Physical properties of various DDT dusts were studied and various methods of grinding DDT mixtures were investigated. Specifications were drafted for dusts containing 10 per cent of DDT in clays. Storage tests were made with the free-flowing and water-dispersible DDT previously developed in this Bureau. Prospective diluents for DDT were examined. The colorimetric method for determination of DDT was refined and modified so that it can now be applied to the determination of minute deposits in various materials, including milk, meat, and fats.

### Treatments For Termites and Wood Preservation

Approximately 150 buildings at Fort Bragg, N. C., and a number at Camp Shelby, Miss., have been given soil-poison treatments against termites on an experimental basis in cooperation with the United States Army Corps of Engineers. It is estimated that expenditures for control and repairs as a result of damage will run into many thousands of dollars. At Camp Shelby the cost of minimum repairs to one building alone was $500. In a soil-poison experiment in the Canal Zone begun 3 years ago, sodium arsenite is by far the most efficient material under test. No failures have occured in 50 plots with this chemical. Pentachlorophenol and orthodichlorobenzene have also given good results.

Records have been made on the condition of sections of trees that were treated 5 to 10 years ago with preservatives by injection into the sap stream. These sections had been installed in service tests in different parts of the South. Much of this wood treated with zinc chloride, sodium arsenite, copper sulfate, and ammonium bifluoride is still in a sound condition. This information will be of particular interest to the farmer who faces the problem of maintaining his fences and no longer has cedar and locust posts available.

In experiments conducted in cooperation with the Louisiana State Highway Department and a commercial company, mahogany plywood panels brush-treated with copper paint such as used on Navy PT boats,

# HERE'S how to check RAT ODORS

**IT'S AMAZING!** ▶ *get "CHEK"*

## SPRAY OR POUR

*SPECIAL . . .*
Ask About the
New PER-MO Antu
Rat Bits in Assorted Flavors

Here's a real rat-odor killer. "CHEK" . . . the newest name in deodorants for putrefactive odors is "CHEK" . . . powerful enough to check odors of decayed animal and vegetable matter. "CHEK" is also used

- For mopping floors (particularly wooden or porous floors).
- Cold storage rooms. Garbage cans.
- Locker room floors (control of Athlete's foot).
- Shower stalls (control of Athlete's foot).

Available in Quarts or Gallons . . . order today . . . send $1.00 for generous sample.

**PER-MO also makes** PER-MO MOTHPROOF LIQUID . . . Fast repeater! Odorless! Packed in Bulk or to your request . . . PER-MO FLAME PROOF LIQUID . . . Approved by Kansas City, Missouri, Fire Marshal. Does not harm fabrics, decorations, etc., that water will not harm. Spray or dip! PER-MO "ANTU" RAT PASTE . . . Prepared ready for use . . . PER-MO "RED SQUILL" RAT PASTE . . . Prepared ready for use. PER-MO RAT BITS . ..Sure death to rats—non-poisonous to humans, pets, domestic animals. PER-MO RAT and MICE LIQUID . . . Two-way sure death to rats and mice.

PER-MO
STANDS THE TEST
IT'S BY FAR THE BEST

*Putrefactive Odors.

*Write Today . . . Full Particulars First Letter*

**PER-MO PRODUCTS COMPANY**
3602-04-B Woodland Kansas City 3, Mo.

# A.F.C. QUALITY PRODUCTS FOR PEST CONTROL

Super Fluorex V, powerful insecticide powder

Sodium Fluoride

Poison Seeds

Carbolic Acid, Cresylic Acid, Borax, Mirbane

Pyrethrum Powder, DDT Powders and Liquids

Sterilan, mothproofing powder

## FOR EFFECTIVE RAT CONTROL

Barium Carbonate, Phosphorus Paste, Rumetan, Arsenic, Fortified Red Squill Extract and Powder, Antu.

Prepared Rat Baits — convenient, ready-to-use cubes. Five different food types.

## FOR TERMITES

Orthodichlorobenzene, Creosote Oil, Sodium Arsenite Powder and Liquid, Pentachlorophenol Concentrate.

*Write for particulars*

**AMERICAN FLUORIDE CORPORATION**
151 WEST 19th STREET NEW YORK 11, N. Y.

# "TOX-EOL" for TERMITE CONTROL

*TIME TESTED*
*TIME PROVED!*

A large volume Termite Control Operator recently wrote us,

"Used your chemical since August, 1941, with an almost 100% efficiency . . . proud of results."

This is just one out of the many unsolicited letters we are constantly receiving proving the effectiveness of "TOX-EOL."

**"TOX-EOL"** Toxic base is chlorinated phenol plus. Is economical and not unpleasant to use. Effective for both wood and soil poisoning. Present cost less than creosote. Shipped in a highly CONCENTRATED liquid saving transportation charges.

*Send today for advertising and dealer co-operation plan.*

**CRE-O-TOX CHEMICAL COMPANY**
*Pioneers in the use of Chlorinated Phenols for termite control.*
Now located in our new plant:
2670 BROAD MEMPHIS 12, TENN.

plastic paints, or Navy formulation 16-X resisted attack by marine borers and fouling organisms for 7½ months. Approximately 40 other materials that were tested failed.

**Insect Identification A Basic Service**

Identifications were made of 51,797 samples of insects received from the following sources: (1) The various divisions of this Bureau engaged in research, control, quarantine, and survey activities; (2) the Army, Navy, Public Health Service, and other Federal agencies; (3) agricultural colleges and experiment stations of every State; (4) individuals, private institutions, and pest-control operators; and (5) foreign governmental agencies and institutions concerned with insect control.

Research in insect classification, essential for the improvement and expansion of the identification service, resulted in the preparation and submission for publication of 27 technical manuscripts covering specific problems in all the major orders of insects.

## Effect of HCN Fumigation on Eggs

"Hens' eggs are sensitive to hydrogen cyanide. Buttenberg Deckert and Gahrtz (1925) found that fertile hens' eggs were killed by fumigation with one per cent of HCN by volume at a temperature - 3° C for four hours, and rendered useless for hatching, although the actual amount of HCN taken up was not large. The effect of cyanide on hens' eggs was also studied by Fere (1897) and Buchanan (1926)."

The above is a reference from Reports on Public Health and Medical Subjects No. 60 issued by the Ministry of Health in London in 1930. This information does not appear to have been generally disseminated throughout the trade since, every once in a while, we will hear from a PCO that he has fumigated a hatchery or similar places and that "the eggs do not hatch out". It will be well, therefore, for the PCO to make note of this important fact and thus save himself from possible trouble, expense and customer dis-satisfaction.

Do not fumigate any place while it contains eggs intended for hatching purposes as they will be sterilized.

This brings up the question as to the effect of HCN on eggs intended for human consumption. As far as is known, the edibility of eggs exposed to HCN gas in the normal course of building or household fumigation, is not affected.

In many cases, a small number of eggs is on hand in dwelling houses and PCO's seldom remove such eggs from the premises prior to fumigation. There has never been any comment regarding the edibility of eggs so exposed to the gas. Although we cannot cite specific instances, we are sure that a large number of warehouses have been fumigated in which eggs were stored, without affecting the edibility of the eggs.

*From "Fumigation News", May—June,* 1947

## A Definition and Short Name For A Newly Developed Insecticidal Organic Chemical

A recent article by Kearns Ingle and Metcalf (Jour. Econ. Ent. 38:661 (1945) reported the toxicity to a number of species of insects of a chlorinated hydrocarbon having the empirical formula $C_{10}H_6Cl_8$. The product was referred to as "1068" and was described as "possibly a mixture of isomers which have as yet not been resolved and evaluated individually." The product and its insecticidal properties have also been subsequently referred to in a goodly number of other publications, statements, and communications which have had general distribution. In these references it has been described in much the same manner as a chlorinated hydrocarbon with the empirical formula $C_{10}H_6Cl_8$. Some references, especially advertisements, have included the trademark names "Velsicol 1068" and "Octa-Klor."

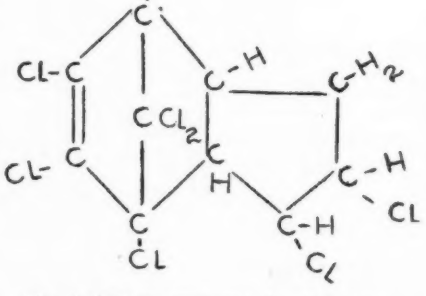
None of these descriptions or designations gives sufficient information to designate accurately the product or inform the investigator in regard to its nature. The description and the designations are also inadequate for labeling commercial insecticides containing the product to meet the requirements for interstate movement under the Insecticide Act of 1910.

At conferences participated in by representatives of the companies producing the product, representatives of the Bureau of Entomology and Plant Quarantine and the Insecticide Division of the Production and Marketing Administration (both of the U. S. Department of Agriculture), and the Food and Drug Administration of the Federal Security Agency, information was developed as to the nature of the product, including the name of principal chemical constituents. It was agreed that use of the long exact chemical name is impracticable and undesirable. It was also agreed to propose and recommend the use of a short common name as a substitute, which would be defined and registered with the U. S. Patent Office to preempt its use as a trademark name. It was further agreed that the name and definition would be submitted to interested organizations, particularly the American Association of Economic Entomologists, with recommendation that they adopt it as standard.

The common name selected is "chlordane," and search of the files at the U. S. Patent Office discloses this name has not been registered. The Chemical name is:

CHLORDANE, 1,2,4,5,6,7,8,8 - octachloro, 4,7 - methano -$3_a$, 4, 7, $7_a$ - tetrahydroindane.

Its structural formula is:



The definition proposed for the commercial products produced for use in compounding insecticide is:

TECHNICAL CHLORDANE - A commercially produced chemical containing 60 to 75 per cent of chlordane, together with 25 to 40 per cent of related compounds occurring in the normal manufacturing processes which are toxic to insects.

### Dr. S. F. Light

We regret to announce the untimely death of Dr. Light, of the University of California, Berkeley, Calif. His body was found floating in a lake where he had been fishing and swimming, June 25.

Dr. Light had been Professor of Zoology at the University since 1926, and was considered one of the most capable teachers in the University. He was also one of the greatest students of the biology and systematics of termites. His loss will be deeply felt.

Dr. Light is survived by his widow, Mrs. Mary Light. We extend our sympathy to the family.

## Insecticides

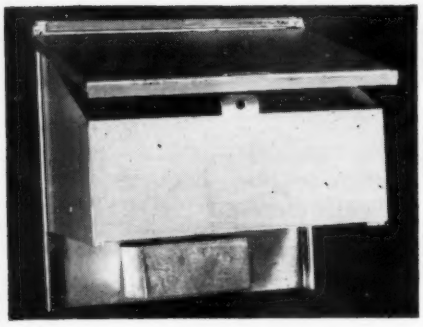
Insecticides—Outlook for 1947 supplies of insecticides according to May Domestic Commerce, remains uncertain; contributing factors are shortage of raw materials, the boxcar situation, and scarcity of containers. Buying interest in both insecticides and fungicides runs high.

Domestic output of refined arsenic continues below capacity owing to labor shortage. Supplies are being channeled principally to the insecticide industry, but requirements may not be met. Prices for calcium arsenate and lead arsenate are on the rise; orders are being taken subject to price in effect at time of shipment. The winter buying interest in copper sulfate has decreased to some extent; however, sizeable stocks have been stored by farmers to meet the coming season's requirements.

The prevailing situation on rotenone is generally good, with imports high. Although 1946 receipts were the highest of recent years, anticipated 1947 demand will also be above recent years, both for livestock and crop protection. Shipments from Peru have exceeded the minimum of 8 million pounds called for under the extended intergovernmental agreement which expires May 7, 1947. Pyrethrum supplies offer no problem. Nicotine remains in short supply. Domestic production of hexaethyl tetraphosphate, coming into prominence as a new insecticide effective against aphids and other soft-bodied insects, may somewhat alleviate the situation.

Production of DDT is running high but demand is still higher and output is sold well ahead. Backlog orders for paradichlorobenzene will tax production for some months ahead and coal tar products in general remain in short supply. Petroleum-oil sprays and most of the materials consumed in household insecticides will be adequate to meet demand.

**Studying Fly Flights**—Spraying or dusting mosquitos with fluorescent compounds is reported for studying the direction and distance insects fly.—(I.N.)



RODENT CONTROL STATION

6-12 stations $2.00 each
12 or more $1.75 each

**MICE-GLUE**
*GETS MICE LIKE FLYPAPER GETS FLIES*
10 lbs. $6.00 25 lbs. $13.50 100 lbs. $45.00

**BIRD-REPELLENT**
*Keeps Pigeons, Starlings and Other Birds from Buildings*
10 lbs. $6.00 25 lbs. $13.50 100 lbs. $45.00

**PHOSPHORUS-PASTE**
*For Rats, Mice and the Large Brown and Black Roaches*
10 lbs. $4.25 25 lbs. $9.00 100 lbs. $32.50

**PEST CONTROL CHEMICALS CO.**
324 Broadway Write for Details BUFFALO, N. Y.

**PYRENONES***

• Good household insecticides can be made without Pyrenones but there is little point in trying to do so when it is so much simpler and more economical to make even better ones with Pyrenones.

• The supply of Pyrenones was not adequate in time to permit their general adoption for 1947 formulations but usage has been on a sufficiently broad scale to demonstrate that their effectiveness and safety exceed expectations.

• Pyrenones are now available in ample if not unlimited amounts. The next few months will set the pattern for 1948 use. There is time for thorough study and trial of the Pyrenones and their place in your present and future plans.

* Reg. U. S. Pat. Office

**DODGE & OLCOTT, Inc.** D.O
*Insecticide Division:* 60 EAST 42ND STREET, NEW YORK 17, NEW YORK
General Offices: 180 VARICK STREET, NEW YORK
Branches: BOSTON • CHICAGO • PHILADELPHIA • ST. LOUIS • LOS ANGELES
Plant and Laboratories: BAYONNE, NEW JERSEY
Canadian Agents: Standard Chemical Company Limited, 195 Fleet St. E., Toronto, Can.

**STRYCHNINE**
**THALLIUM**
**IMPREGNATED**
**IMPORTED**
**CANARY SEED**

BIOLOGICALLY TESTED FOR ACCEPTANCE AND KILL

**SHAFF LABORATORIES INC.**
*Mfg. Chemists*
1660-62 Coney Island Ave.
Brooklyn 30, N. Y.

**COMPLETE HAND PROTECTION**
**Against Chemicals, Wet or Dry**

Edmonts are ideal for handling insecticides and other chemicals used in fumigation and extermination. Also full protection against dirt and contaminated articles. Tougher and longer-wearing than ordinary rubber gloves, they resist snags and tears, are easier on and off. Inside is soft, cotton fabric, outside is Neoprene rubber which is fully resistant to oil and aqueous base solutions. Wear them for complete safety. Sold by leading industrial and safety equipment suppliers.

Edmont *Rubber-Coated* WORK GLOVES
513 ORANGE ST. . . COSHOCTON, OHIO

# The Federal Insecticide, Fungicide, and Rodenticide Act

United States Department of Agriculture

ON JUNE 25, 1947, H. R. 1237, a bill related to the marketing of economic poisons, became law. This law, to be administered by the livestock Branch of the Production and Marketing Administration, is known as the Federal Insecticide, Fungicide and Rodenticide Act. It replaces the Insecticide Act of 1910 and greatly expands the protection to the public relative to the sale and marketing of economic poisons. It applies to rodenticides, herbicides, and devices for pest control, in addition to insecticides and fungicides which were covered by the Insecticide Act of 1910.

The new act is of great significance to agriculture and the public in general. Many new and powerful insecticides and fungicides have come on the market in recent years. Rodenticides are being marketed in large quantities, and it is essential to know that such preparations will do an effective job on pest control. The same applies to herbicides for weed control. It is important that the public know it is getting economic poisons that will perform the job claimed for them and be properly labeled as to their hazards. Because it applies to more kinds of economic poisons and covers a broader scope of protective and enforcement activities than the former act, the law will give farm producers and others a greater degree of protection from misbranded or adulterated products. Any economic poison that comes under the broad scope of the law will be brought to the attention of enforcement officials before it can be legally offered to the public.

**Important Provisions of the New Act**

**1. Registration of economic poisons prior to sale or introduction into interstate and foreign commerce.** With the exception of the new act's much broader application, perhaps the most important provision is that which requires registration with the U. S. Department of Agriculture of all insecticides, fungicides, rodenticides, and herbicides. Under the law, the marketing of any of these economic poisons is prohibited, among other reasons, if (a) they are not registered, (b) if claims made for them or directions for their use differ in substance from the representations made to the Secretary of Agriculture at the time the product is registered, or (c) if the composition of the product differs from that represented.

To assure continued protection, provision is made in the law for keeping registrations up to date. The Secretary may cancel registrations periodically every 5 years unless the registrant requests that registration be continued in effect. If the label of an article does not comply with the provisions of the act, the person seeking the registration will be given an opportunity to make the required changes. An article may be registered under protest if the registrant insists that no changes are necessary, but he will be subject to additional penalties if found guilty of violating provisions of the act.

**2. Protection of the public against poisoning by requiring prominently displayed warnings on labeling of highly toxic economic poisons, as well as ingredient statements.** This more or less obvious provision will give human beings protection against injury due to improper or accidental use of these products. These statements of warning or caution must appear on the label of an economic poison to prevent injury to human beings, animals and vegetation. Labels on certain toxic substances, to be prescribed by the Secretary after hearing, must bear the skull and crossbones, the word "poison", and an antidote statement. These products must also carry an ingredient statement that includes the name and percentage of each active ingredient and the total percentage of inert ingredients.

**3. Coloring or discoloring of specified white powdered poisons is required to prevent them from being mistaken for flour, sugar, salt, baking powder, or other similar articles commonly used in the preparation of foodstuffs.** This provision, like the one requiring the display of poison warnings, gives human beings added protection in the use of these products.

**4. Instructions for use of the products to provide adequate protection to the public are required.** The labels of economic poisons must bear directions for use which will be effective for the purposes intended, without causing injury to humans, or valuable plants or animals.

**5. Declarations that insecticides, fungicides and herbicides are misbranded if they are injurious to man, vertebrate animals, or vegetation (except woods), when properly used.** As defined in the new act, misbranding includes the same elements covered in the Insecticide Act of 1910. However, in additions to the former definitions, an economic poison is misbranded if its label (a) bears any reference under the act, (b) does not contain instructions for use that are necessary and adequate for the protection of the public, (c) does not bear an adequate warning or caution statement, (d) does not bear an ingredient statement on the part of the retail package which is presented or displayed customary conditions of purchase. In certain cases the ingredient statement may appear prominently on some other part of the label.

The reference to registration must be omitted because such action might be construed as an indorsement of the article by the Department, which is not the case. The registrant assumes full responsibility for the proper labeling.

**6. Information is required regarding the delivery, movement, or holding of economic poisons and devices.** Conformity with this provision is effected chiefly by authorization in the act of limited examination of books and records of manufacturers and users by officials of the U. S. Department of Agriculture.

The new law gives the Secretary authority to formulate rules and regulations necessary for its effective administration and enforcement. These rules and regulations will be prescribed as soon as possible. The provisions of the act became effective as to devices on June 25, 1947. They will become effective as to rodenticides and herbicides on December 25, 1947, and as to insecticides and fungicides on June 25, 1948.

Department officials urge manufacturers and users to refrain from sending materials to the Department for registration until notice is given through the general trade press. While details are yet to be worked out, manufacturers and distributors of rodenticides and herbicides will have 6 months from the date the law was enacted in which to register their products. Insecticides and fungicides

# LENZ RED SQUILL
## PROFITABLE PRODUCTS

**54% plus 2% profit on each sale**

*For resale and use in your work*

**PRODUCTS THAT — WORK — SELL — REPEAT**

**When results must count, depend on LENZ RED SQUILL PASTE it is safe and certain**

**EXPERTS ADVISE THE USE OF RED SQUILL**

**Jobs can be cheaply prebaited with the Lenz Method use fresh bread**

*Used for years with excellent results*

**Get the jobber's price by placing a six dozen order of the assorted products and sizes, such as 2 doz. $1; 2 doz. 50c; 2 doz. prepared. Deduct 54% and 2% from the retail price and send us your check. Smaller lots 40% & 2%**

| | Retail | |
|---|---|---|
| 6-⅛th oz. Lenz Rat Paste | $1.00 | 2 doz. to carton |
| 3 oz. Lenz Rat Paste | .50 | 2 doz. to carton |
| 24 oz. Lenz Rat Paste (Kit size) | 3.75 | ½ doz. to carton |
| Prepared baits | .25 | 2 doz. pkg., carton |

**Bulk, 5½ lb. cans $1.00 per pound Net, no discount.**

## LENZ LABORATORY
**SYCAMORE, ILLINOIS**



**The Most Widely Used**
**PYROPHYLLITE**
**in the pest control field is**

# PYRAX ABB

**The tremendous and increasing tonnage sold each year reflects the confidence of entomologists and plant pathologists in our product.**

***Literature and samples on request***

## R. T. VANDERBILT CO., INC.
***Specialties Department***
**230 PARK AVENUE, NEW YORK 17, N. Y.**



# MAGIKIL
ANT BAIT **JELLY**

*Easy* TO USE

# KILLS ANTS

**CONTAINS THALLIUM SULPHATE**

**Packed in Convenient Service Containers**

**ANT TRAPS, 1, 3 & 7½ oz. Tubes 10 Lb. Jars**

**Used professionally it assures customer satisfaction.**

**Preferred by discriminating PCO's.**

**For safety in service work use MAGIKIL ANT TRAPS.**

## Lethelin Products Co., Inc.
**MOUNT VERNON** **NEW YORK**



REFERENCE MANUAL
OF THE
1947 CONFERENCE-CONVENTION
HELD AT RIVERSIDE, CALIF.
NOW READY

Every bit of information
every word of the talks
given there
by the
Scientists, professors,
entomologists and
business men who
addressed us there

**ALL OF THIS VALUABLE INFORMATION IN ONE BIG VOLUME**

*Every PCO should have this*

**Price $5.00**

*order your Copy now*

**order from**

## G. B. WARDERS, SECT'Y
**126 No. Second Ave., Upland Calif., Phone 314-144**

will not need to be registered until 12 months after its passage. Until the provisions of the new act become effective, the Insecticide Act of 1910 will continue to apply to insecticides and fungicides.

Devices—instruments or contrivences for use against insects, fungi, rodents and other pests—are covered by the new law but they need not be registered with the Department. Accordingly, manuacturers of such devices may continue their output as usual, but under the terms of the law they must not make any misleading claims for their products. Devices do not include equipment used for the application of economic poisons when sold separately from the poisons themselves. Examples of devices include animal traps, lights intended to destroy insects, and special types of lights to destroy bacteria.

On commenting on the new act, officials of the Department pointed out that the general endorsement given the bill when it was under consideration is evidence of its need and desirability. Endorsement came from national associations of producers and distributors, State departments of agriculture, farm organizations and other interested groups. The bill was passed unanimously by both Houses of Congress.

As additional information becomes available regarding regulations and other matters incident to the administration and enforcement of the Act, it will be made public as soon as possible.

### Stipulation

**Goulard & Olena, Inc.**, Skillman, N. J., has stipulated (7599) to cease representing that "Go-Nex" is non-combustible, is the safest insecticide, will knock down insects instantaneously or kill them within 60 seconds.

**The Lofstrand Co.**, Silver Spring, Md., has stipulated (7607) to cease representing or implying that U. S. Department of Agriculture has approved "Lofstrand Insecticide

### Dr. E. A. Back
### Well-Known Entomologist Retires

After more than 38 years of service in the U. S. Department of Agriculture Dr. Ernest A. Back, well-known authority on the control of insect pests of the household and stored products, retired from the Bureau of Entomology and Plant Quarantine on June 30. Except for a period of about 1½ years in 1911 and 1912, during which he served as State Entomologist of Virginia and Entomologist of the Virginia Agricultural Experiment Station, Dr. Back has been employed continuously in entomological work in the Department since July 1, 1907.

During World Wars I and II, Dr. Back was consultant to the armed forces on various problems concerning the protection of stored products from insect attack and rendered invaluable service to the country in this capacity. He also assisted the American Red Cross and other Government agencies on problems of protecting stored food and fabrics from insect damage, as well as advising and recommending procedures to scientists in charge of household insect control projects. Dr. Back is the author of numerous publications upon the subject of household insects and the conservation of food and stored products from insect damage.

Born in Northampton, Mass., October 7, 1880, Dr. Back attended grammar and high schools in Northampton, and received his B.S. and Ph.D degrees from Massachusetts Agricultural College, now the University of Massachusetts. His first assignment in the Bureau was as assistant in investigation of the white fly on citrus in Florida. He was in field charge of that project from 1908 until he resigned from the Bureau in December 1910 to become associated with the State of Virginia. On July 1, 1912 he was reappointed in the Bureau of Entomology and assigned to conduct special studies on the Mediterranean fruit fly in the Hawaiian Islands. He remained in Hawaii until 1917, when he was placed in charge of a new division created in the Bureau to conduct investigations on insects affecting grains and other stored products. His investigations since have been entirely in that field and have included research on fumigation and control of insects infesting homes, hospitals, hotels, stores, bakeries, warehouses, mills, grain elevators, and manufacturing plants, and those attacking manufactured and stored products such as hides, furs, fabrics, food, confections, nut meats and drugs.

On August 1, Dr. Back will leave for London, England, where with Dr. R. T. Cotton, in charge of the Bureau's Manhatten, Kansas, laboratory, he will represent the U. S. Department of Agriculture at the international conference of specialists on infestations of stored products, sponsored by the Food and Ariculture Organization.

### Economic Poisons Bill Becomes Law

President Truman signed the Andresen bill (HR 1237) for federal regulations of the marketing and labeling of economic poisons and devices, during the last week of June.

Administration of this bill, now known as Public Law 104, will be under the administration of W. G. Reed, chief of the insecticide division of the livestock branch of the Department of Agriculture.

Insecticides, fungicides, herbicides, rodenticides and the various devices used in the application of these materials are covered by the new law. The law is effective immediately with respect to the applicative devices, but there is nothing positive required of the manufacturers, such as registration of the devices with the department.

Preliminary work is now under way with respect toward the issuance of rules and regulations for the registration of the various poisons.

Those sections of the law controlling marketing of rodenticides and herbicides become effective at the end of six months; while insecticides and fungicides become effective in one year. Registration of these products with the department and the filing of ingredient statements and submission of labeling will have to be done before the effective dates in the law, but the time for such filing will be announced subsequently in the rules and regulations now being drawn up.

### Uniform Law Enacted in Nine States

The Uniform State Economic Poison Bill, drafted by Council of State Governments, has been enacted since Jan. 1 by the following nine states: Arkansas, Montana, S. Dakota, N. Dakota, Vermont, Colorado, Kansas, N. Carolina and New York.

Most of the nine Legislatures made no major changes in the uniform draft. There were other States where bills were introduced which affected economic poisons and which varied widely from the pattern—but these either were withdrawn by their authors or failed to pass.

With enactment of the new Federal Insecticide, Fungicide and Rodenticide Act (HR 1237), added stimulus will be given to adoption of the uniform bill in other States. In fact, probably the major reason it failed to become law this year in New Mexico, Utah, West Virginia, South Carolina and Massachusetts was lack of a similar Federal law to control interstate shipment, according to Dr. Charles L. Smith, Technical adviser to the A. I. F.


## Concise Chemical and Technical Dictionary

**PUTS 50,000 ESSENTIAL WORKING FACTS AT THE FINGERTIPS OF THE NATION'S TECHNICIANS.**

**1120 pages - 6X9 - $10.00**
**Postage 25c**

This basic work of technical reference, in dictionary form, gives the lastest, most accurate data obtainable about processes, apparatus, machinery, terms, materials, finished products, practices, elements, composition, uses, properties, trade names, formulae, etc., a veritable library of indispensible professional knowledge. Included are several useful tables.

**For Immediate Delivery - Order Today**
**PESTS AND THEIR CONTROL**
**1200 Oak St., Kansas City 6, Mo.**


### Please Notice

For some months the demand for back Pests issues has been more than we have been able to supply. Then too, from time to time subscribers move and fail to notify us of their new address. After 3 or 6 months, we receive word that they have not received their back issues. May we urge that as soon as you move, to please notify us so that you will not miss any future important issues. Also should you miss receiving their monthly issue, please do advise us the following month or else we may be out of that months number.


## UNBIDDEN HOUSE GUESTS

**by Dr. Hugo Hartnack**

**540 pages, 500 pictures, Weight 4 pounds.**

"It is not a textbook—yet it contains a world of factual information, it is not a novel—yet it holds one's interest and supplies genuine amusement. The book covers a tremendous field. An Unbidden House Guest is considered to be any plant or animal that ventures on or within a dwelling. The scope of the material is still broader, since some of these housepests bring with them other plants and animals that cause human disease. Even if not studied, much general information can be obtained by even a casual scanning."

**Price $12.00 plus 25 cents postage**

## — Calendar of Meetings —

National Sanitary Supply Association will hold a central regional meeting at the Fort Shelby hotel in Detroit, Mich., September 11-12.

NPCA Convention - October 27, to 29, 1947, Bellevue Stratford Hotel, Philadelphia, Pa.

NAIDM's 34th Annual Meeting at Lord Baltimore Hotel, Baltimore, December 1-3, 1947.

Chemical Industries Exposition, Grand Central Palace, New York, December 1-6, 1947.

American Association of Economic Entomologists (In conjunction with meeting of American Association for Advancement of Science, December 26-31, Congress Hotel, Chicago, Ill.


## RODENTICIDE INSURANCE

**Our Public Liability policies give you essential coverage against the risks of "1080." Certificates of Insurance issued to meet your requirements.**

Other type policies, in all representative
AMERICAN STOCK COMPANIES, for:

Public Liability — Workmen's Compensation
Auto Liability — Products Liability
Property Damage — Accident & Health
All Allied Lines

*As Well As*
*Life Insurance and all Forms of Employee Insurance Plans*

MEMBER NATIONAL PEST CONTROL ASSOCIATION

*Inquiries cordially invited. There is, of course, no obligation.*

**E. & D. A. WEISBURGER**
*Insurance since 1915*
1440 Broadway — New York City 18, N. Y.

*To be SURE and SAFE use*
## TERMICIDE
**THE IDEAL WOOD PRESERVATIVE**
Deadly toxic to termites, rot, fungi. Harmless to humans, animals, plants. Long effectiveness and great coverage assure low cost.

## TERMICIDE NO. 46
**THE IDEAL SOIL STERILIZER**
Kills and Controls Subterranean Termites.
Concentrated Emulsion
1 gal. reduces with 9 gals. of water
*Write today for full details and prices to:*
**ATLANTIC VARNISH COMPANY**
4829 Huntington Drive North — Los Angeles 32, California

## EXTERMINATORS CHEMICALS

**RUMETAN (Zinc Phosphide)**
FOR RAT CONTROL

(The ideal poison for
Rats, Mice and Mole Crickets
Effective and Economical)

Sodium Fluoride, White and Tinted
Sodium Silico Fluoride
Pyrethrum Powder
Sodium Arsenate, etc.

*Write for Details*

**Pfaltz & Bauer, Inc.**
EMPIRE STATE BUILDING, NEW YORK

## JUST IN TIME FOR SPRING

Made of Red Neoprene Rubber

8 oz. Terne-Plate Bright Spouts Brass Fittings

$ 9.50 Doz. in Doz. Lot
$10.40 Doz.
Less Doz. Lots

F.O.B. Jersey City 7, N. J.

**Thos. W. Houchin Corp.**
87-101 Ferry St. — Jersey City 7, N. J.

# LOCAL ORGANIZATION NEWS

## Indiana State PC Association

The Indiana State Pest Contral Association and Pest Control Operators of the State of Indiana met June 22nd at Turkey Run State Park for a family get acquainted meeting. The gathering was attended by about 50. A luncheon of baked Indiana turkey with all the trimmings was enjoyed by all.

At 2 P. M. the meeting was called to order in the east lounge of the Turkey run Inn by President Walter S. Gibson, and arrangements made for our next meeting at Purdue University on September the 13th, under the direction of Dr. J. J. Davis.

The afternoon session was given over to an inspection of Charlie Partlow's (Reliable Exterminating Company) new building and facilities.

The following firms were represented at the meeting:

Federal Chemical Company (Mr. & Mrs. B. Jordan)
Arab Pest Control (Mr. & Mrs. Lee Truman)
South Bend Exterminating Company (Mr. & Mrs. M. Bailie)
General Exterminating Company (Mr. & Mrs. George Spellios)
Cyanide Gas Company (Mr. & Mrs. Clyde T. Miller)
E. H. Purcel Company (Mr. & Mrs. Purcel)
Hammond Exterminating Company (Mr. & Mrs. Dan Mell)
Purdue University (Dr. & Mrs. J. J. Davis & Brother)
A. D. Bosley Company (Mr. & Mrs. Bosley)
Entomological Service & Supply (Virgil Knapp & Mr. & Mrs. Perkins)
Draper Exterminating Company (Mr. & Mrs. Draper)

Many of the above with their children took the trails through the Park and enjoyed the lovely scenic points.

*submitted by A. D. Bosley,*
*Secretary-Treasurer*

## New York State PC Association

New York State P C Association held its second meeting at the offices of I. B. Carncross, Syracuse Chemical Co., Syracuse, N. Y. June 2.

The following were elected as officers of the association:

President, I. B. Carncross, Syracuse, N. Y.
Vice-President, George Dummitt, Syracuse, N. Y.
Sect'y & Treas., H. S. Lewis, Buffalo, N. Y.

Board of Directors, Leon Morre, Utica, N. Y., Don Lewis, Buffalo, N. Y., Harry Linindoll, Albany, N. Y.

It was decided that the Annual Meetings be held at the Cornell Conference. The association is now planning to work for a top-notch Conference.

Those in attendance were:

W. H. Viel, City Pest Control.
James Keady, Syracuse, N. Y.
H. S. Lewis, Buffalo, N. Y.
L. A. Moore, L. A. Moore & Co., Utica, N. Y.
Harry Linindoll, H. W. Linindoll Co., Albany, N. Y.
George Dummitt, Arrow Exterminating Co., Syracuse, N. Y.
H. L. Clarke, Clarke Chemical Co. Syracuse, N. Y.
E. J. Browne, County Chemical Co., Syracuse, N. Y.
D. H. Lewis, Rose Exterminator Co., Buffalo, N. Y.
I. B. Carncross, Syracuse Chemical Co., Syracuse, N. Y.

### Government Publication

Clothes Moths, by E. A. Black, principal Ent.; Division of Insects Affecting Man and Animals, Bureau of Entomology and Plant Quarantine. Leaflet No. 145, U. S. D. A.. For sale by Supt. of Documents, Washington 25, D. C. (Price 5c. Stamps not acceptable.)

**Picture taken by ROBERT LEWIS**
**Indiana State PCO Association Meeting held Turkey Run State Park, June 22, 1947**

## Control of Insects Affecting Elms, Other Shade Trees and Forests

Recommendations have been prepared by Geigy Company, Inc., of New York, originators of DDT insecticides, for treating trees affected by the elm bark beetle and elm leaf beetle. Other recommendations have been drawn up for treatment of trees affected by other insects. The Geigy statement says:

"For the first time forest entomologists, shade tree experts, and home owners appear to have at their command insecticides which have many efficient uses and which are practical to apply. It now appears possible to take care not only of specimen shade trees but also large forested areas because DDT insecticides are available in various forms and those available are adaptable for application with equipment ranging in size from hand sprayers to airplane-type dispersal units.

"DDT insecticides have two major advantages over other insect toxicants. First, only a small quantity of DDT is required for a given area. Second, their remarkable residual properties are such that, in many instances, commercial control is achieved with a single application. The major insects affecting trees for which Geigy has prepared DDT insecticides include:

"Cankerworms, catalpa caterpiller, boxwood leafminer, elm bark beetle, elm leaf beetle, gypsey moth, hemlock looper, Japanese beetle, leafhoppers, locust leafminer, pine sawflies, pine tip moth, spruce budworm, tent caterpillar, treehoppers, tussock moth.

"It is readily apparent that DDT is effective against many serious defoliators, bark beetles, certain sucking insects and some wood borers. In controlling some of these tree pests not only are primary depredations being reduced but likewise the spread of certain destructive fungi may be materially curtailed. In the latter category, the elm bark beetles are among those which carry a serious plant parasite - the Dutch Elm Disease. If it proves feasible to destroy the beetles, this disease may cease to be a menace to the valued elms of this country and abroad.

"Attention to the depredations of the elm insects has been centered lately on communities in New Jersey and elsewhere, which have been making a concentrated fight on these destroyers of stately elm trees.

"The U. S. Department of Agriculture has stated that sprays of DDT 'offer the most promising means of protection against the Dutch Elm Disease.'

The Bureau suggested a 2% DDT spray followed 75 days later by a 1% solution. By use of an oil-DDT spray, the government entomologists reported dead and dying elms could be rendered relatively harmless as scources of infection. Oil sprays of such concentration should not be applied to the foliage but only to the trunk and main branches of the elms.

As to the control of other insects, the statement said:

"To give an idea of the low dosages employed of Geigy DDT insecticides - combine 16½ gals. of a 30% DDT oil solution with 83½ gals. of oil diluent and apply at the rate of 1 gal. per acre to control the gypsey moth. Where an emulsion is desirable for use in ordinary spraying equipment conmbine 1 part of an emulsifiable product containing 25% DDT with 400 parts of water (1 qt. per 100 gals. of water). Use a 50% DDT wettable powder at the rate of 1 lb. in 100 gals. of water for cankerworms and tent caterpillars."

# PHOSPHOROUS PASTE

## FOR ROACHES and RATS

### SINCE 1874

**J-O Phosphorous Paste** is so compounded as to eliminate the hazard of fire and possesses advantageous qualities peculiar to itself. A properly made **Phosphorous Paste** such as **J-O** is absolutely safe to use. It cannot burn or set fire to other substances.

**Phosphorous,** however, remains basic in the compound because it is the most toxic chemical used in pest exterminating, being more toxic than arsenic, strychnine or thalium. Approximately one-tenth of a grain will kill a rat. Phosphorous is a slow poison, taking from 6 to 18 hours to kill. Due to its slow but positive action, the rat succumbs to this poison. He becomes very uncomfortable and, seeking fresh air and water, in most cases, leaves the premises and dies in the open.

For all species of roaches, this product is **UNEXCELLED.**

**JOHN OPITZ, INC.**

50-14 39th Street Long Island City 4, N. Y.

*Manufacturers of Exterminating Products Since 1874*

# THALLIUM SULPHATE

## 99⁺%

**PROMPT SHIPMENT FROM STOCK**

**METAL TRADERS, INC.**

**67 Wall St., N. Y. 5**

**A LURE MICE CAN'T RESIST**

# WISCONE CHEESE FLAVOR

**THE NEW SYNTHETIC LIQUID LURE**

**Wiscone will make seeds or any other mouse bait more attractive and more easily located by mice, when mixed at the rate of 1½ ozs. to 100 lbs. bait.**

**A TRIAL WILL CONVINCE YOU**

***INTRODUCTORY PRICE — 1 Pint $3.75***

***Check with Order. Shipped Prepaid U. S. A. and Canada***

**LINDENBERG EXTRACT CO.**

***Game Trapping Lures and Scientific Bait Scents***

**424 South Broadway, Los Angeles 13, California, U. S. A.**

**For Economical Rat Extermination ...Use the Recommended**

# Milapaco

**PAPER PLACEMENT CUPS**

Milapaco No. 75050J Paper Placement Cup. Capacity, ½ ounce. One-piece construction, moisture-resistant.

**HERE'S** a convenient design in poison placement cups that will save you both money and time. It's the Milapaco No. 75050-J paper cup of ½-ounce capacity. Also available in ¾-ounce and 1 ounce sizes. Made of special heavy-weight moisture-resistant stock, one-piece construction. Shallow shape simplifies use and low side walls provide easy accessibility for effective extermination. Used by many exterminator organizations the country over and recommended by health authorities, the Milapaco paper cup provides a low cost container for many purposes.

**WRITE OR WIRE FOR PRICES ON THE QUANTITY YOU NEED**

**MILWAUKEE LACE PAPER CO.**

1306 EAST MEINECKE AVENUE • MILWAUKEE 12, WISCONSIN

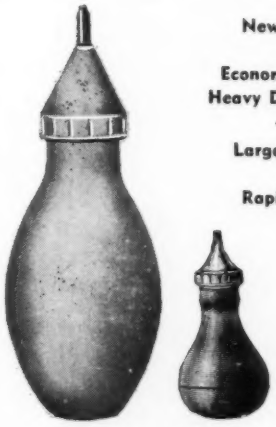
*Established 1898*

# CENTROBULB

**QUALITY FOR THE PROFESSION**

**The Best Synthetic Rubber Gives Lasting Service**

**Brass Extension Nozzles For Extra Long Reach $1.00 Each**



**New Brass Tip For Economy, Neatness Heavy Duty Operation**

**Largest Opening For Rapid Refilling**

**Full Satisfaction Guaranteed**

**AVAILABLE NOW**

*In All Three Sizes*

**No. 1— 4 oz.—$3.00 Per Doz.**
**No. A— 8 oz.— 7.20 Per Doz.**
**No. B—12 oz.— 9.00 Per Doz.**

**CENTRAL RUBBER PRODUCTS CO.**

821 BROADWAY NEW YORK 3, N. Y.

# WHAT'S NEW IN PEST CONTROL-PERSONALS

### National Shade Tree Conference

The 23rd annual convention of the National Shade Tree Conference will be held this summer in Cleveland from August 18 to 22, according to Charles F. Irish, National Conference President, Cleveland Arborist and General Chairman of the convention.

At least 1,000 park authorities, Department of Agriculture research scientists, nurserymen, and commercial arborists together with others interested in the commercial aspects of tree growth and care will meet to discuss the latest developments in shade tree culture. Representatives from the country at large will attend.

The year's newest development — mist spraying of trees—is to be featured in the four-day conference as well as spraying materials and specialized applications. Field demonstrations and commercial exhibits numbering 50 will be more diversified than at any previous conference.

Headquarters for the 1947 convention will be at Hotel Cleveland.

### It's A Girl For The Farrells

Daughters are in style. "Bill" Farrell, operator of Effective Ext. Co., Brooklyn, N. Y., and perpetual treasurer of the PEA, has a new one, Frances F., who arrived on July 17 writes, Mom: "I knew I had it in me and sure happy everything came out all right Who's excited? ?"

### Stork Note

Raymond Kelly, head of Paramount Ext. Co., Brooklyn, N. Y., is recovering from excitement of becoming a papa to Brion W., who arrived on July 19 and tipped the scales at 7 lbs. 2 ozs. Congratulations!

### Congratulations

Congratulations to Ann and Arden Price who on June 19th were blessed by the arrival of a son, Wayne Arden. Mr. Price is supervising the business of W. B. McCloud & Co. of Chicago, Ill.

### Ralph Olson

S. B. Penick & Company, producers and manufacturers of botanical drugs and fine chemicals, announces the appointment of Mr. Ralph Olson as Manager of the Company's Chicago Branch.

Mr. Olson succeeds Mr. Harold Meyer, Vice President, who has been transferred to the Executive Staff of the House Office.

Mr. Olson joined the Company twelve years ago as representative of the Chicago Branch, and has made an enviable record for himself in assisting in the building up of that division of the business. Under his management, it is expected to continue its progress.

### Mr. William E. Stadler

Mr. William E. Stadler has been appointed Sales Representative in Ohio, West Virginia, and Eastern Kentucky for the Larvacide Division of Innis, Speiden & Co., 117 Liberty St., New York City, it was announced this month by Conrad C. Johnson, manager of the division.

A 1946 graduate of Massachusetts State College, Mr. Stadler has been working with S. S. Pennock, wholesale florists, since February of that year. He will cooperate with flower and vegetable growers in solving pest control and soil fumigation problems. Mr. Stadler will handle sales of Larvacide, Iscobrome and DDT Aerosol Bombs for green house use.

No stranger to the Larvacide field, Mr. Stadler previously worked two summers for Innis, Speiden on the application of this chlorpicrin fumigant for soil work. Known to the trade as "Bill," he has gained much popularity as an amiable, cooperative worker who "knows his stuff" when it comes to soil fumigation.

### R. C. Hudson

R. C. Hudson of the H. D. Hudson Manufacturing Company, Chicago, Illinois, was elected President of the National Sprayer and Duster Association on June 20. Harold F. Brandt of the Dobbins Manufacturing Company, Elkhart, Indiana, was elected Vice President. R. D. Lewis, Frank J. Zink and John F. Benham, all of Chicago, were re-elected Treasurer, Counsel and Executive Secretary respectively. G. H. Collier of Elkhart, Indiana, is the retiring President.

At the meeting, the member manufacturers reported an increasing demand for hand dusters and small hand and power sprayers. Both the city and farm market for spraying and dusting equipment has been strong this year. According to Secretary Benham, more farmers, gardeners and home owners are spraying this year for fly control and weed control.

The sprayer and duster manufacturers report that plants are still operating far from capacity because of tin and steel shortages.

The organization authorized a study of changing market needs for spraying and dusting equipment. Educational projects to acquaint the public with the proper use of sprayers and dusters was also approved at the business meeting.

Elected members of the Executive Board in addition to the officers were:

Ralph H. Chapin, R. E. Chapin Manufacturing Works, Batavia, N. Y.

T. M. Burton, D. B Smith and Company, Utica, N. Y.

C. D. Leiter, F. E Myers & Bro. Company, Ashland, Ohio.

S. H. Samuels, Standard Container Corporation, Montclair, N. J.

V. A. Snell, Lowell Manufacturing Company, Chicago, Illinois.

### Larvacide Field Experiments

A series of Larvacide field experiments was instituted this month by Conrad C. Johnson, Manager, Insecticide Division, Innis, Speiden & Company, 117 Liberty Street, New York City, in a personal tour which will take him from coast to coast.

The company's Insecticide Division is making a continuing study of the effects of chlorpicrin as a nematode, fungicide, rodenticide and insecticide in the various temperate zones. Resultant data will be available to the trade in the near future.

### R. & H. Develops New Insecticide New Type DDT Formulation

Development of a new insecticide which possesses insect killing power comparable to DDT and which, it is stated, has been proved up to 1800 per cent safer to human beings, house pets, and farm animals, was announced on June 4 by the Rohm & Haas Company, Philadelphia chemical manufacturers. Known as Rhothane, the new material will be distributed to household and industrial insecticide manufacturers and the agricultural trade throughout the country.

The new chemical, dichloro diphenyl dichloroethane, is similar to DDT in action and is a result of research on chlorinated hydro carbons. It kills all insects that DDT kills, it is stated. When used indoors as a residual spray, the killing power of the materials lasts as long as three months. Extensive field tests have shown that Rhothane is deadly to flies, bedbugs, fleas and roaches; it is the best known control for the destructive corn ear worm. In the control of mosquito larvae, independent investigators, it is stated, have found that Rhothane is as effective or more so than DDT while considerably less toxic to fish.

Concerning the toxicological investigations of Rhothane, Dr. C. E. Faust, in an issue of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION says that Rhothane "is not more than one-fourth as toxic to warm-blooded animals as is DDT, but is more toxic, on immediate contact, to mosquito larvae and has a more prolonged effect . . ." Studies by four investigators at the National Institute of Health find that "the dichloroethane derivative, DDD, is between 1-16 and 1-20 as toxic as DDT." Other findings confirm these results.

The increased safety factor is especially important to exterminators who work in the confined areas of houses, factories, and farm buildings, or where exposure to insecticides is prolonged.

In Pennsylvania, one application of the chemical was used at a 5 per cent concentration to eliminate flies in a dairy processing plant. Walls of the processing room and an adjoining stable, both abounding in flies, were sprayed at the rate of one gallon per 1000 square feet. The fly population was reduced immediately, and the plant was opened for work. Despite the severe humid conditions present in the plant, this control lasted from July 15 until the middle of September, it is reported.

### New Type DDT Formulation

The manufacture of an entirely new type of DDT formulation, completely different from any now on the market, has recently been announced by Michigan Chemical Corporation of Saint Louis, Michigan. The product, known as PESTMASTER Colloidal Dispersion, carries extremely fine, colloidal-size solid particles of DDT in a water-base. Pilot

plant quantities are now being made, with plans for rapid expansion to full scale manufacture as demand increases.

This new product, a ready-to-use 40 per cent DDT concentrate, is a development of the corporation's research laboratories. The unique physical properties of the material make it advantageous for many uses, it is stated. The colloidal DDT particles are about one-third the size of those in ordinary "micron size" wettable powders and about 1-25th the size of DDT particles produced by ordinary grinding. The extremely fine particles remain in suspension longer and may be used at strengths as high as 5 per cent or more without clogging spray nozzles, the manufacturer states.

The water-base Dispersion contains no solids other than DDT, is non-harmful to leaf surfaces and to plant tissues and may be used under any conditions where wettable powders or emulsifiable oils concentrate are ordinarily used.

Tests, the producer reports, have already demonstrated the usefulness of this product in dairy barns, for spraying livestock and for use in public buildings, dairies, and food establishments.

## Necrology

CONDOLENCES: JOHN HOGAN, JR., PCO, 39, who resided at 2004 Elysian Fields, New Orleans, La., died suddenly on June 19. A likeable person, Mr. Hogan was active last fall in promoting the NPCA convention at New Orleans. He also participated in the Southern PCO Conference this year and spoke on rat control. Surviving are his parents and his wife, Mrs. Hogan.

CONDOLENCES: DR. JOHN S. HOUSER, 66, head of the Department of Entomology at the Ohio Experiment Station and a past president of the American Association of Economic Entomologists, died suddenly on June 25, as a result of a heart attack. A genuine friend of the industry, Dr. Houser was recognized as one of the foremost entomologists in the U. S.

**Display set up by Harold R. Corbett, PCO, of St. Thomas, Ontario, Canada, during showing of films, "Vegetable Pests" and "Insect Enemies of Man" in the local vocational school auditorium. Mr. Corbett obtained use of the films through the courtesy of W. S. Bomby, Ocean Chemicals, Ltd., Toronto. Three baskets of groceries shown at the foot of the table were donated by Mr. Corbett as door prizes. The irregular pieces of paper to right and left of center panel are pieces of wall paper from a roach-inested room. The panel on the right is the photo history of roaches from "Life" magazine. Pictures in centre of wall are of the Canadian, Ontario and Purdue meetings.**

**REMEDY FOR FUTURE HEADACHES**

Looking much like ordinary wood, this "Penta" Perservative treated lumber is is a unique modern building material. Impregnated with pentachlorphenol, the wood is practically odorless, is clean to handle and takes paint perfectly. Yet it is safe from destruction by termites beetles or decay.

Best news of all, to lumber users, is that "Penta" Preservative protection is there to stay. Pentachlorphenol is virtually insoluble in water, hence does not leach out. Any lumber treating plant may obtain "Penta" Preservative from branches of the distributor, the Chapman Chemical Company, 333 North Michigan Avenue, Chicago 1, Illinois.

### Louis Frankel

Louis Frankel, seventy-eight, president of Exterminating Services, Inc; Termite Control Inc.; National Housecleaning Contractors, etc.; located at 9 W. 29th St. N. Y., died at his summer home, Lawence, L. I., on July 2. He lived at 115 Central Park West, N. Y., N. Y.

Mr. Frankel came to this country from Poland as a boy. In 1886 he originated a cleaning service for hotels and office buildings which steadily expanded over sixty years. He also headed an affiliate in Havana, Cuba, called Servicios Exterminadores.

Surviving are two daughters, Mrs. Sadie Sweig and Mrs. Gertrude Goodman, and a son, William Frankel, to whom we extend our condolences. His wife, Mrs. Julia Frankel, died in 1938.

### NSSA To Meet Sept. 11-12.

Nationl Sanitary Supply Association will hold a central regional meeting at the Fort Shelby hotel in Detroit, Mich., September 11-12.

### Piperonyl Butoxide

"A New and Safe Insecticide For The Household Field" by Dr. Walter E. Dove, has been published in The American Journal of Tropical Medicine, Vol. 27, No. 5, May 1947. Reprints of this article can be had by writing to Dodge & Olcott, Inc., 60 E. 42nd St., New York 17, N. Y.

# WRITE FOR THESE BOOKLETS

### CHLORDANE LITERATURE

Efforts are being made to publish information and data on Chlordane, the new residual insect toxicant, as soon as practical after field test reports are received, according to Julius Hyman and Company of Denver which has recently released several bulletins.

The Denver company, which manufactures Chlordane under the trade name OCTA-KLOR, has available on request the following publications:

Technical Supplement No. 1 which is a summary of the effectiveness of Chlordane on a number of insects, alphabetically listd, and includes some information on Chlordane dosages and applicatiions.

Technical Supplemnt No. 202 on the control of ants with Chlordane.

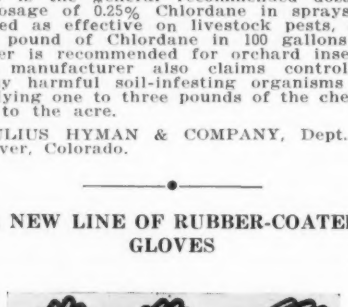
Technical Supplement No. 203 has to do with Livestock parasite control with Chlordane.

General Circular No. 101 which contains brief facts of general interest pretaining to this new insect killer.

These publicatiions give an indication of the general effectiveness of this new chemical in pest control. It is stated that 2 per cent of Chlordane (In proper base) is recommended for residual control of most household, institutional, and indusrial insects: for most agricultural pests, one pound of Chlordane in either dusts or sprays per acre is the general recommended dosage; a dosage of 0.25% Chlordane in sprays is stated as effective on livestock pests, and one pound of Chlordane in 100 gallons of water is recommended for orchard insects. The manufacturer also claims control of many harmful soil-infesting organisms by applying one to three pounds of the chemical to the acre.

JULIUS HYMAN & COMPANY, Dept. P, Denver, Colorado.

### A NEW LINE OF RUBBER-COATED GLOVES



A bright red band around the edge of the cuff is the distinguishing mark of the new REDMONT line of rubber-coated gloves by the Edmont Manufacturing Company, Coshocton, Ohio.

Emphasizing new safety features and other advancements in construction, the red band also indicates that the cuff can be turned back to prevent runback of fluids when hands are held upward.

A new pattern with wider thumb span and longer palm, designed to give more hand freedom without binding; a new high-tensile fabric to which the rubber coating is thoroughly bonded, providing increased xibility, a firmer grip, and greater hand comfort these are among the improvements, along with curved thumb and fingers, originated by Edmont.

An improved rubber coating that is oil-, grease-, acid-, and caustic-resisting makes these gloves especially suitable for workers handling liquids, or harmful materials. They are said to resist rips and tears and will not snag when handling rough or sharp objects.

Redmonts are available in three gaunlet lengths, 10" Safety Cuff, 12" and 14" overall lengths, also in standard knit wrist style.

### EFFECT OF HCN FUMICATION ON EGGS

This news bulletin discusses the effect of HCN fumigation on eggs intended for hatching purposes and those intended for human consumption. American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y. (Ask for Bulletin No. 107.)

**Methods of Analyzing Municipal and Industrial Waters, Subject of New Solvay Bulletin.**

A new 100 page technical bulletin on the analysis of municipal and indutrial waters has been announced by the Solvay Corporation. Designed to present methods suitable for rapid work without undue sacrifice in accuracy, the book contains sections on mineral analysis, stationery boiler water analysis, municipal and railroad water supplies, swimming pools and pollution.

It also gives information on reagents, indicators and standard solutions, conversion tables, a four page index and a list of atomic weights. Copies may be obtained without charge by writing to Solvay Sales Corporation, Advertising and Sales Promotion Department, 40 Rector Street, New York 6, requesting Solvay Technical and Engineering Service Bulletin No. 11, "Water Analysis".

### NEW SAFETY EQUIPMENT CATALOG

The new, complete 178-page 6-B Catalog has just been published by Mine Safety Appliances Company, describing and illustrating the complete range of M.S.A. safety equipment for industrial application, including many new products.

A 6-page introductory section illustrates and describes the complete research laboratories and plant facilities of Mine Safety Appliances Company.

The regular edition of the 6-B Catalog is in its usual 8½"x11" size. Also available is a new, handy, pocket-size edition of this catalog 5"x6½", containing the same material and number of pages as the large edition, but in the miniature size.

Copies may be secured by writing to Mine Safety Appliances Company, Pittsburgh 8, Pa.

### NEW MSA FULFACE DUST MASK FOR ALL-OVER HEAD PROTECTION AGAINST DUSTS

The new MSA Fulface Dust Mask, it is stated, combines complete facial and respiratory protection against dusts - without obstructing vision, and is made by Mine Safety Appliances Company. Comfort and safety where nuisance or harmful dusts affect the eyes as well as the respiratory system are assured by the gas-tight seal of the MSA Fulface Mask and its replaceable filters.

Lightweight and flexible, yet durably constructed, the Fulface Mask covers the entire face, conforming snugly to facial contours. Head bands are easily and quickly adjustable.

Twin large-area throw away filters remove dusts efficiently yet offer very low breathing resistance. Inexpensive and easily replaceable, the filters are encased in durable, lightweight aluminum containers which are placed low at the sides of the Fulface Mask to permit unobstructed vision. A rubber exhalation valve, positive in action, provides breathing ease and quick drainage of moisture.

A large single clear plastic lens permits wide-angle vision to the wearer of the MSA Fulface Dust Mask. Rubber air deflectors direct incoming air over the inside surface of the lens, preventing fogging

For Bulletin No.CR-19 on the new Fulface Dust Mask write this publication or direct to Mine Safety Appliances Company, Braddock, Thomas, and Meade Streets, Pittsburgh 8, Pa.

FOR THE FOLLOWING PUBLICATIONS WRITE MINE SAFETY APPLIANCES CO., Brad-

### RESPIRATOR

Bulletin discusses "Clear-Vue" model Dustfoe Respirator, which it is stated is durable, odorless, noncorrosive and a non-conductor of electricity and heat and gives a proved protection against toxic dusts.

### HYDROCYANIC GAS MASK

Bulletin describes Hydrocyanic gas mask with all-vision facepiece.

### ALL-PLASTIC GOGGLE

Circular describes a new lightweight, all-plastic goggle which provides comfortable, durable protection for the eyes.

### RED SQUILL FOR RAT CONTROL

An informative brochure on the value of red squill in control of rats, mice; its effect on domestic animals and man.

WRITE S. B. PENICK & CO., 50 Church St., N. Y. C. 7.

### SIX TOXICANTS

WRITE HERCULES POWDER CO., Wilmington. Release describes six different types of toxicants, combinations of a type of Thanite and DDT or DDT.

### "THE THANITE FAMILY"

32-page book of interest to the maker of insecticides. It gives all the latest facts on Hercules' line of toxicants, such as Thanite, Hercules DDT, Thanicol 70+DDT Concentrate, Water-Miscible DDT Concentrate, and Oil-Soluble DDT Concentrate. Contains sections on household sprays, flea powders, information on pest control and pediculosis control, among others. Includes test data and comparative tables on all major insecticide intoxicants and a series of photographs entitled "How to Use a Fly Spray."

Write HERCULES POWDER CO., Inc., Dept. P, Wilmington 99, Del.

### INSECTICIDE CONCENTRATES

Herein discussed are pyrethrum products, fortified red squill, rotenone and DDT products, benzene hexachloride, the newest of the synthetic insecticides.

R. J. PRENTISS & CO., Inc., Dept. P, 110 William Street, New York 7, N. Y.

### FORTIFIED RED SQUILL

Leaflet discusses value of fortified red squill powder or liquid concentrate in the control of rodents. Some constructive suggestions on how to mix effective baits are also included.

R. J. PRENTISS & CO., Inc., Dept. P, 110 William Street, New York 7, N. Y.

### 10% DDT POWDER

Circular describes powder containing 10% technical grade DDT and trade-marked "Micro-Mesh." "Micro-Mesh", it is explained, is a powder that has received ultra fine grinding and as a result the active surface of the insecticide has been increased many thousand fold and therefore makes for more effective application, resists caking, and one which penetrates into even the smallest crevices when applied by bellows.

R. J. PRENTISS & CO., Inc., Dept. P, 110 William Street, New York 7, N. Y.

## Business Opportunities

**(Classified)**

**RATES — For individuals seeking employment, 5c per word, minimum $1.00. All others 10c per word, minimum, $2.00. All advertisements must be in the hands of the publishers seven days before publication date and must be accompanied by cash or money order for payment in full. The publishers are not responsible for any false or misleading advertisements.**

***Replies to advertisements where box number only is indicated should be addressed c/o PESTS, 1200 Oak St., Kansas City 6, Mo., giving box number as well.***

### GAMMEXANE OR SALE

Gammexane Dust cntaining 4 per cent Benzene Hexachloride. Completely compounded ready for use. $.42 per lb. in 100 lots and $.50 per pound. in smaller lots. Terms COD FOB Chicago. 2 per cent off if payment accompanies order. Box 27 Pests.

### SALES MANAGER

Wanted manager salesmen thorough knowledge pest control. Business well established. Eastern territory. Profit sharing basis. Write full particulars. All letters held in strict confidence. Box 22 Pests.

**NO-ROACH**, the new colorless coating completely eliminates roaches up to 6 months and more. Not a spray, it's harmless to children and pets. $3.50 per gallon, (enough for over 35 jobs). Gastan Johnston Company, 865 First Ave., N. Y. C. 17.

New York concern with several branches in New Jersey wants experienced salesman, entomologist, but not essential, excellent opportunity Must have good sales production record. No consideration given unless salary and experience in detail are stated. Confidential. Box 6, Pests.

## INSECTICIDE FOGGING—A NEW BUSINESS

Pest control operators and contract insecticide sprayers in particular, tree surgeons, crop dusters, farm implement dealers, mechanically minded and nature loving veterans and numerous other types of small businessmen in general, might profitably look into the possibilities of an interesting new business—that of custom-fogging—which involves fogging insecticides, hormones, fungicides or weed-killers—by means of a unique fog-generator called TIFA, or Todd Insecticidal Fog Applicator. This compact, portable machine, developed and manufactured by the Todd Shipyards Corporation's Combusion Equipment Division, in its Elmhurst, Queens, N. Y., plant, is already being profitably used by a number of custom-foggers around the country.

TIFA is a sturdy, protable machine, which can easily be handled by one can on the back of a jeep, small truck, trailer, or wagon, and comes modestly priced so that the total investment, including the conveyance comes under $2500. TIFA breaks up any liquid or powder suspended in liquid by a process quite similar to jet-propulsion. It operates with a small gasoline motor, and creates a terrific blast of hot air in its combusion chamber which smashes the individual particles of moisture into infinitesimally smaller particles ranging from ½ micron to 30 microns. The fog emitted from this machine is thousands of times finer than the lightest spray, and its dry white vapor billows out along the ground, up the sides of buildings, across lawns, through shrubbery, into every corner and crevice of a building for thorough coverage.

Almost any of the better known agents can be and have been used in it successfully as well as the new concentrates—DDT, 2, 4-D dithane, 1068, HET, etc. The fog is powerful enough to kill any bug that insecticides would ordinarily destroy, or to eliminate weeds with the accepted hormones, and retains its effective power depending upon the material carried in it for from two weeks to five months after application. Yet this method has the tremendous advantage of many times more complete coverage than dusts or liquid spray, because wet sprays settle down on the exposed surfaces of plants or whatever is being treated. Discharges from spray rigs do leave a heavier but less evenly spread residue, which naturally kills insects for a longer period than fog-impregnated surfaces, but too, it has the neutralizing disadvantages of killing fish and bees, which are vital to pollenization of flowers; also birds, which are valuable insect killers themselves; and in certain cases fowl, livestock and dogs, which eat the heavily DDT-laden insects.

During the first year after it was introduced, the Todd-made fog generator revealed its versatile possibilities at beaches, resorts, wool warehouses, ranches, farms of all kinds, hospitals, garbage dumps race tracks, ball parks, carnival grounds, etc. In several cases—San Antonio, Texas; Texas City and a number of New Jersey counties and towns, it has been enlisted in insect control programs, aimed particularly at preventing polio or other diseases thought to be spread by flies and mosquitoes.

It has been estimated that insects alone cost farms, livestock growers, nursery operators, some $1,500,000,000 annually in ruined crops, sickly cattle, and spoiled plants, not to mention the human deaths arising out of pest-spread diseases. This is the tremendous, continuing market which custom-foggers are now successfully invading for health, comfort, and profit to their customers.

At this moment, custom-foggers are profitably operating, some in conjunction with their regular business, others while acting as dealers for TIFA. The leaders are Dick Hollyer and David Terwilliger, of Wyckoff, New Jersey, who pioneered in the field last year, forming Fog, Inc.; Kane Tree Service, of Saratoga Springs, which took on a dealership and started a custom-fogging service as a very profitable sideline to their tree pruning and surgery business; Whitmore & Wormsley of Babylon, L.I., well-known tree surgeons and insect control experts who have followed Kane's example; Warren H. Skinner of Bridgeport, Conn.; Chris Gunther, whose Automatic Engineering Industries operates in a wide swath in Central New York; and others in Texas, Florida, Arizona, Georgia, Maryland, Delaware, Massachusetts and Rhode Island.

Their experiences have been widely varied and a brief resume of some of the more interesting applications should give a fair idea of TIFA's possibilities.

The Kane Tree Service, for example, fogged the Saratoga Race Track last year and this. At first the track manager was slightly concerned that the fog would create consternation among the spectators, but he changed his attitude when a number of horse-fans approached him after he had gone inside the track to check the effects of the fogging. "What a thoughtful gesture," one of them exclaimed, brushing dead flies and mosquitoes off his shoulder. The manager soon saw that the general reaction was surprise mingled with pleasure. Soon the very lights at the top of the grandstand seemed brighter—these were night races—as the swarms of bugs hovering near them dropped away to die.

The result was a running contract for the following year, for Saratoga—plus Belmont, Aqueduct and Jamacia tracks, all operated by the same syndicate. The fees Kane collected for these jobs exceeded the purchase price of a fog generator. Yet the clients would not have bought the machines for themselves, figuring it was more economical to have an outsider provide the service.

Kane has also made excellent progress fogging nearby summer resorts, industrial establishments, and creameries.

Al Worsley of Babylon, L.I., took a leaf from Kane's book and expanded his long-established tree service to include pest control at the famed Roosevelt Raceway at Westbury, L.I., where the colorful trotting races are held. Worsley, formerly with the U.S. Forestry Service, has applied the enormously successful fogging system to orchards, townships, farms, and dog kennels.

Dick Hollyer and David Terwilliger constitute perhaps the most successful team in the country, making good at custom-fogging. They fill the gaps between sales of TIFA for which they are dealers, by actlally going out and soliciting business for themselves. Custom-foggers are among their best customers for buying new machines.

In their first year as custom-foggers they racked up an impressive list of regular clients, including a high-class girls' camp, carnival grounds, laundries, summer resorts, farms, private homes and estates, etc. Much of the business keeps them going pretty strongly even over the fall and winter months. In spring and summer however, their activities are so heavy as to warrant the addition of a couple of men.

One of their typical fogging jobs was at Rocco's Villa, Blairstown, New Jersey, a well-known roadside eating establishment, which suffered somewhat in previous seasons from insects which distressed outdoor diners. The owner avers that since the DDT-residue was laid to his entire premises by TIFA, he can serve cocktails and excellent dinners on the lawn without any interference from the sky armadas.

Traveling carnivals are common in New Jersey—and their biggest drawbacks have always been the state's most ubiquitous citizen—the skeeter. This season one carnival, planning a three-day stay in Hollyer's territory, was practically ready "to pack up and git" after the first night, because the bug invasion was so powerful that it discouraged visitors from lingering. Foresightedly, he called in Fog, Inc., about which he had only casually heard, and they soon put an end to his troubles in one quick application. The next two nights the carnival played to capacity business—a sure indication that the service pays off.

On a New Jersey turkey farm, just to carry the possibilities further, the owner stated after having the entire area covered by DDT-fog, that for the first time in four years he can serve cocktails and have outdoor picnics on verandahs which are near the poultry breeding places. Previously he had been bothered a good deal by the flies and other insects which bred rapidly on his place because of nearby pools of stagnant water.

Then there was the case of the oat farmer. Mustard plants were choking his crop to death, and the farmer had decided not at harvest at all that year. A custom-fogger saved him from a total loss by blanketing the field with 2, 4-D, the very effective weed-killer which will kill any broad leaf, alfalfa, peas, lima beans, etc., without affecting stalk plants like oats. The happy farmer was able to harvest 20 acres of his crop as a result. When a custom-fogger puts money into a man's pockets like this, it's a cinch he's earning himself a good client for future business.

Fog, Inc., had similarly good results on a tomato farm. Last year a devastating blight struck New Jersey tomato farms for the first time in years. Farmers in that state were unfamiliar with its cause and effect, so that they were at a loss to combat it. One large farmer, with thousands of dollars worth of ripe fruit threatened with complete spoilage, called in the custom-foggers at 7:30 p.m. one night, and explained his predicament. Because it was already dark, they could not maneuver their ¾-ton truck through the tomato patches for complete coverage, so they settled for completely encircling the farm and shooting the fog inward along the perimeter. By the next morning, when they returned to complete the job on the inside, the blight had done its dirty work and the entire interior was lost. However, the border, which had been buried under the fog of diathane, was completely free of blight and harvestable.

Todd's versatile machine also proved its efficacy at a textile printing plant, where night flying insects used to get into bolts of cloth with a huge loss of material; at a slaughterhouse where flies breed fast and thick, and they killed them so fast that the nearby waters boiled with fish coming to the surface to devour them; at a high school in Paterson where the cafeteria got a perfect roach control system with 1068; and a laundry which got a thorough de-mothing from fogged 1068; at a large greenhouse where HET—or Hexaethyl tetraphosphate was fogged into the interior and left overnight to rid them completely of aphids, red mite, and red spider; a malt brewing establishment where the bins were fogged with 5% DDT to eliminate grain weevils where they had been using poisonous cyanide for years; at large garbage dumps which got the same treatment and the results earned reams of thankful comments from nearby residents no longer bothered by pests; and at a hog farm, a sport arena, and a bathing, boating, and picnicking resort, with similarly good results.

With opportunities like that—and many more not mentioned, and probably many we don't even know about ourselves yet, it would appear that these fog merchants have a lucrative field indeed and are performing a service to mankind at the same time.

**A FOGGING SERVICE - COVERING PRIVATE HOMES AND ESTATES**
**Todd Shipyards Corporation Equipment Division.**
**TIFA - Todd Insecticidal Fog Applicator**

**HAPPY HORSES AT BELMONT PARK, LONG ISLAND**
**get the DDT-fog treatment from a TIFA, made by the Todd Shipyards Corporation, and operated by the Kane Fogging Service at Saratoga Springs. The vaporized insecticide will remain on their hides for weeks, and bring sudden death to flies and other insects which means the racers will be happier and should perform better.**

# --BOOKS--

***Broaden Your Knowledge—Increase Your Proficiency—Help You in Your Business***

Please remit check with order as this will save additional expense and time.

**A list of new books includes:**

**People**
**Price $2.50 plus 15c postage**

**Chemistry of Insecticides and Fungicides**
**Price $4.00 plus 15c postage**

**Helping People Buy**
**Price $2.50 plus 15c postage**

**Strategy In Selling**
**Price $6.00 plus 20c postage**

**Outlines of Entomology by Dr. Imms**
**Price $3.75 plus 15c postage**

**Insects Injurious to the Household and Annoying to Man**
**Price $2.50. Postage 15c**

**Manual for the Study of Insects**
**Price $4.00 plus 15c postage**

## Unbidden House Guests

**By DR. HUGO HARTNACK**

The volume discusses about 2,000 house guests. It consists of 4 parts:

**I. General Part:** What are housepests today? Borderlines of Housepest field. Climate of the House. Housepests worldwide. Influence of the house on the housepest. Spoorology (Diagnostic) of Housepests. Damage by housepests (54 pages of pictures). Pests and Wastes. Fighting housepests outdoors. Exterminating methods. Formulae. Pages: 238.

**II. Plants as Housepests.** Bacteria. Molds which live in the house. Timber rot, fungus. What plants do to housepests and what housepests do to plants and plant products. Pages: 62.

**III. Lower Animals.** Protozoa, worms, snails, millepedes, spiders, mites, many others, as far as they are housepests. Pages: 112.

**V. Backboned Animals.** Chordata, coldblooded and warmblooded. Rodents, rats and mice take 56 pages. Formulae, Index. Pages: 148.

**Price $12.00, plus 25c postage**

**The New 1945**

## Chemical Formulary—Vol. VII

**By EDITOR-IN-CHIEF, H. BENNETT**

**Price $7.00 plus 25c postage**

Volume VII of "The Chemical Formulary" includes thousands of the best and most practical formulae, compiled by authorities and experts in each field of industry. Each formula is new, and different from those in previous volumes.

Formulas for pest controls are extensive, and are the results of the most recent research. They include general and agricultural insecticides, parasiticides, larvicides, vermin exterminators, cattle grub control, Ant poison, mothproofing emulsions, fly control spray, Japanese beetle larvae control, lawn grub control, roach powder, silver fish poison, hide and skin beetle control, insect repellents, horticultural sprays, and Rotenone-Derris substitutes.

This valuable book describes and explains the latest commercial methods and processes. It will bring you valuable data and ideas that would otherwise be accessible only after consulting dozens of other books.

## Substitutes

**By H. BENNETT**

**Price $4.00 plus 15c postage**

A handbook of substitutes and alternatives for chemicals, fibres, metals and other commercial products including a plan for choosing proper substitutes. This book is the result of the author's wide knowledge of substitutes and alternatives for numerous products in diverse industrial fields.

CONTENTS: Substitute Requirements; Formulation; Proportions; Methods of Manufacture; Costs; Use of the Finished Product; Testing; List of Substitutes and Alternatives.

## "How to Know the Insects"

A very valuable book for every pest control operator. This book, with its 140 pages and more than 250 careful drawings, is an excellent reference book for P.C.O.'s as well as for experienced entomologists.

**Price for spiral binding.....$1.50 plus 15c postage**

## Spray Chemicals and Application Equipment

The new book "Spray Chemicals and Application Equipment" is the result of six years research and collection of data by Wayne B. Fisher, B.S.A., Purdue University, chemical sales representative, and commercial horticulturist, cooperating with Dr. J. A. McClintock, Professor of Horticulture, Purdue University (co-author).

The book "Spray Chemicals and Application Equipment" is divided into two parts. Part one gives the interesting historical background of many chemicals and detailed discussions and photographs showing how they are manufactured. In addition, much discussion is devoted to methods of using spray chemicals, to insects and diseases controlled by the specific chemicals, and to methods of improving present day pest control practices.

Part two is a complete discussion describing almost every type of sprayer and duster available to the public for use in applying spray chemicals. About 300 illustrations are included in this section, and all types of equipment is shown ranging from the simplest atomizer sprayer to the largest commercial sprayers and airplane dusting equipment.

**Price $4.00 plus 15c postage**
**Foreign $5.00 plus 35c postage**

## Practical Emulsions

**By H. BENNETT**

**Price $8.50 plus 25c postage**

An authoritative handbook which concentrates upon the more practical side of manufacturing, using and evaluating emulsions for industrial use and commercial distribution.

CONTENTS: Emulsifying Agents; Types of Emulsions and Foams; Methods; Formulation, Equipment; Stability; General Technical Emulsions; Dispersing Agents and Wetting Agents; List of Emulsions; List of Demulsifying and Defoaming Agents; Agricultural Spray Emulsions; Cutting Oils, Soluble Oils, Miscible Oils; Emulsifying Agents; Bituminous Emulsions; Cleaners and Soaps; Cosmetic and Drug Emulsions; Defoaming Agents; Food Emulsions; Gasoline Emulsions; Lacquer Emulsions; Leather Treatment Emulsions; Lubricant Emulsions; Medicinal Emulsions; Paint Emulsions; Paper Processing Emulsions; Polish Emulsions; Resin and Rubber Emulsions; Textile Emulsions; Miscellaneous; Dispersions.

## Practical Tree Surgery

**By MILLARD F. BLAIR**

An authoritative manual indispensable for Spray Operators and Tree Surgeons. It gives valuable information pertaining to the association between trees, fungi, and insects; and discusses the means employable in obviating some of the most serious injuries to them. Contains 89 excellent illustrations and line drawings.

**Cloth binding .....$4.00 plus 15c postage**
**Special binding ..... 5.00 plus 15c postage**

## Insect Enemies of Shade Trees

**By GLENN W. HERRICK**

This book discusses primarily the problem of preservation of shade trees from insect pests also describing accepted methods of fertilizing shade trees. It is intended for pest control operators engaged in the business of treating and caring for shade trees, and for all others interested in preserving shade trees. The book discusses in detail all the important insect enemies of shade trees east of the Rocky Mountains, and most of those on the Pacific coast. The book is illustrated with 350 photographs and drawings. Contains 417 pages. **Price, $5.00 plus 15c postage.**

## 202 Common Household Pests of North America

**BY DR. HUGO HARTNACK**

A 320 page book dealing with 202 common household pests of North America and showing about 400 illustrations.

The book contains valuable information. It not only deals with all common and less common household pests, but also with rodents, pigeons, sparrows, spiders, centipedes and mites. All are arranged in a distinct systematic order which makes it easier for one to know the relationship of each pest.

A book that should be in every PCO library.

**Price $5.00 plus 15c postage**

## DDT and the Insect Problem

**By James C. Leary, Pres. Nat'l Assn. of Science Writers; William I Fishbein, Epidemiologist; and Lawrence C. Slater.**

DDT and the insect problem is a new book just off the press. This volume is a complete and up-to-date facts about development, applications and effectiveness of today's No. 1 insect killer—DDT.

The book covers crop protection, animal husbandry and elimination of household insects, destruction of garden pests, etc., pointing out the effect of DDT on various types of insects.

Price $2.50 plus 15c postage.

## The Chemistry of Synthetic Substances

**By EMIL DREHER**

"A brilliant summation of the latest research in the chemistry of synthetic substances. We recommend this book highly for its completeness. It will satisfy those who have waited for a thoroughly competent dissertation in the field."

**Price $3.00 plus 15c postage.**

## The World of Insects

**By CARL D. DUNCAN**
**Professor of Entomology and Botany**
**and GAYLE PICKWELL**
**Professor of Zoology**
**SAN JOSE STATE COLLEGE**

In this new book the authors give a general view of a vast and fascinating world.

Comparatively brief and nontechnical, the book reviews the many fields upon which the insect impinges, discussing such topics as insect structures, how insects grow up, insect food and feeding habits, insect food-getting devices, how insects reproduce themselves, how insects get air, how insects move, how insects are protected, insect voices, insect fitness, insect orders, social life among the insects, the value of insects, injurious insects and their control, where to look for insects, rearing insects, and how to collect and preserve insects.

One of the outstanding features of the book is the collection of 194 unusual illustrations, including many striking photographs original with the authors.

**393 Pages, 6x9, Illustrated.....$4.00 plus 15c postage**

## Virus Diseases in Man, Animal and Plant

A survey and reports covering the major research work done the last decade.

The book gives a survey of the monetary status of virus investigation with special consideration of the most recent literature, especially foreign. One of the most important books of its kind offered.

**Price $5.00 plus 15c postage**

## Termites & Termite Control

An indexed reference book produced by the University of California Termites Investigation Committee of engineers, scientists, and business men in six years' collaboration.

Contains the latest researches in facts on termites, the latest practical methods for exterminators, builders and architects. Contains 795 pages, including index; profusely illustrated.

**Price (the new edition), Cloth Bound.... $6.50 Plus 30c postage**

## Insect Pests

**By WM. CLUNIE HARVEY and HARRY HILL**
**Price $4.25 plus 15c postage**

The extermination of vermin is a skilled proceeding requiring the employment of scientific methods and of persons possessing technical knowledge. This authoritative book will prove of definite and practical value for all who are interested in the control of insect pests and in the prevention of disease.

CONTENTS: General Outlines of Insect Control: The Bed-Bug; The Flea; The Louse; Other Insect Pests; Building Construction and Infestation; Gaseous Fumigants; Other Specifics; The Technique of Fumigation; Insect Control and Educational Measures; Legislative Control; Human Toxicology; Disinfestation of Foodstuffs; Disinfestation of Ships; Forms and Records; Index.

**ORDER FROM PESTS, 1200 OAK STREET, KANSAS CITY, MO.**

# IT'S YOUR MOVE

## to bigger profits

**WITH**

## PowcO Brand ANTU

Powco Brand ANTU is effective wherever there is a rodent problem—in flour mills, meat plants, corn cribs, homes, country clubs, docks, refuse heaps, factories, boxcars, camps, poultry houses and warehouses. How does it fit into your program?

Investigate Powco ANTU. You'll find it a high-yield profit item, backed by the Powell name and Powell research. Describe your needs, and your sample will reach you by return mail.

## John Powell & Co., Inc.

**ONE PARK AVENUE, NEW YORK 16, N.Y.**

**SALES OFFICES:** CHICAGO • SAN FRANCISCO • PITTSBURGH • PHILADELPHIA
***Canada:*** TORONTO • MONTREAL

**POWCO BRAND PRODUCTS:** *Antu • Pyrin R • Pyrin D-20 • JP #10 • JP #25 • JP #30 JP #50 • JP 50W • Pyrethrum Powders and Extracts • Stimtex "A" • Rotenone Powders • Sabadilla Aerosol Formulas • 2, 4-D • BHC (Benzene Hexachloride) • HETP (Hexaethyl Tetraphosphate)*

# AEROSOL BOMBS FOR RESALE

**F**illed with Standard Approved Insecticide—2% Pyrethrum Extract, 3% D.D.T., 10% Solvents and 85% Freon.

At prices which will enable Distributors to handle the bombs at attractive profits.

Supplied with Distributor's label if ordered in sufficient quantities.

Packed 24 to a Shipping Carton.

---

HI-TOX, MORTICIDE and SUPER-MORTICIDE are now obtainable with D.D.T. added. NO INCREASE IN OUR PRICES.

D.D.T. Solutions containing from 5% to 50% D.D.T. Technical Grade.

D.D.T. Powders with 10% to 50% D.D.T. Technical Grade.

MORTOLIN—Concentrate for Moth-proofing Compounds.

*Write our office nearest you for full particulars.*

**Associated Chemists, Inc.**

1906 N. HALSTED STREET
CHICAGO 14, ILLINOIS

EASTERN OFFICE: Velsor Wright Company, 8 West 40th St., New York 18, N. Y.
TEXAS OFFICE: The Carroll Company, 1323 Wall Street, Dallas, Texas